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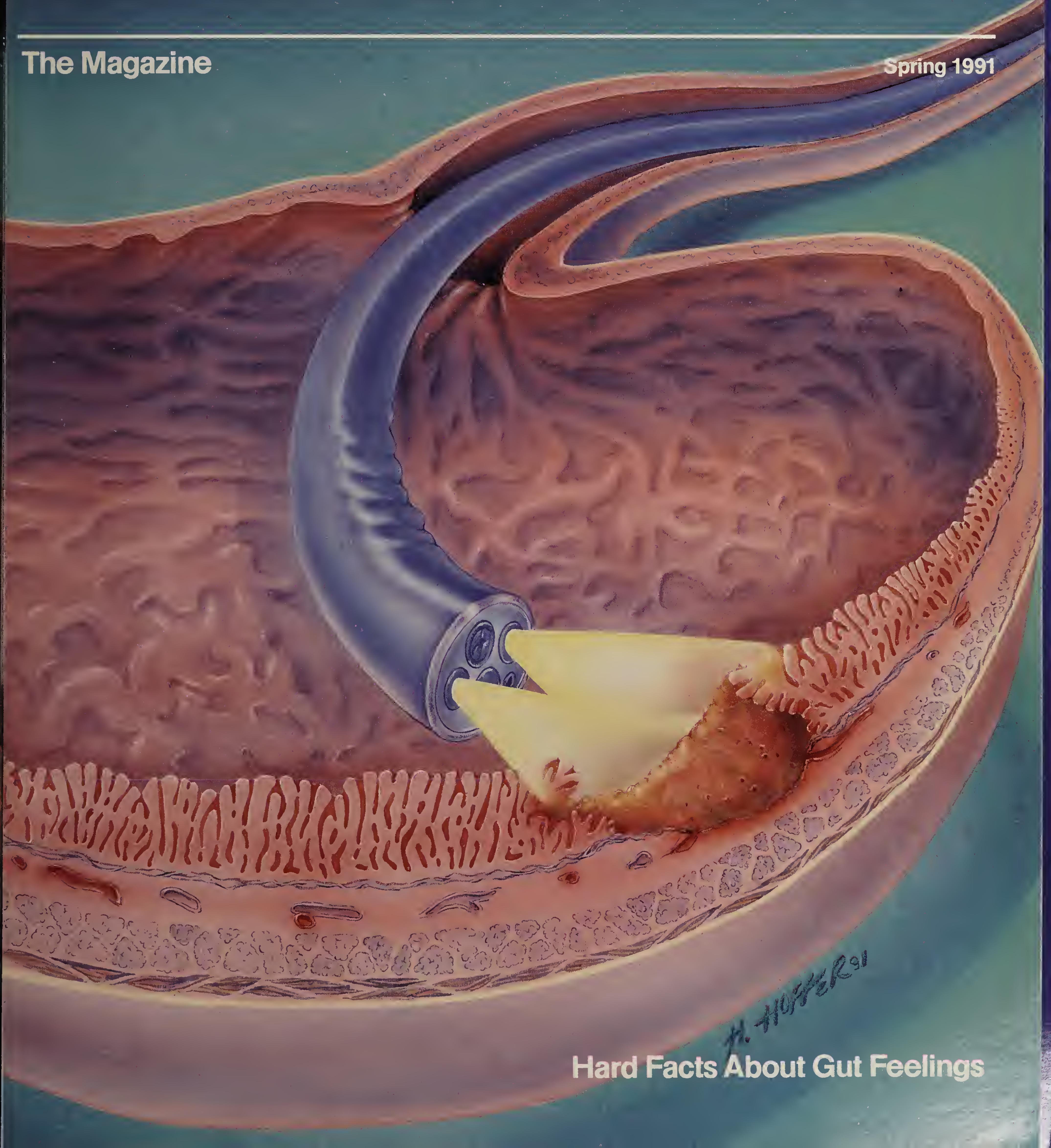

Hard Facts About Gut Feelings

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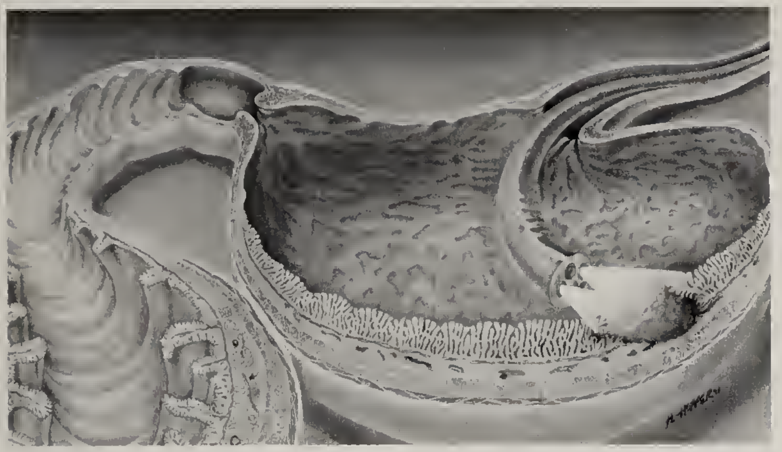
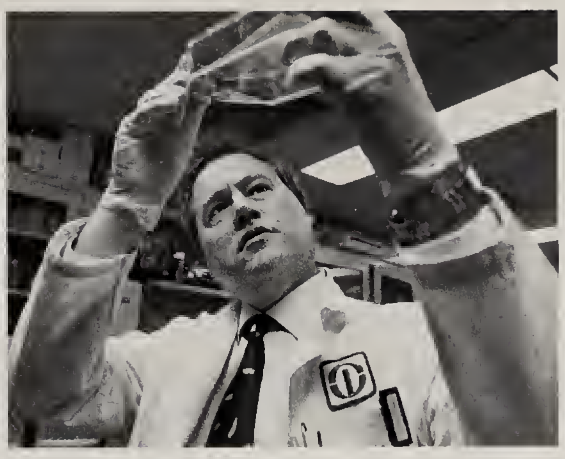




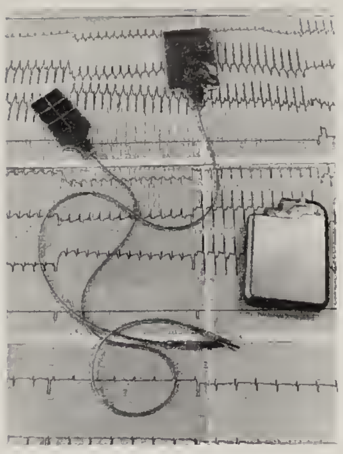


Table of Contents

HARD FACTS ABOUT GUT FEELINGS 3
From heartburn to cancer, digestive diseases affect millions
By Cheryl Janusz

THE ROMANCE OF DIGESTION 12
The digestive system from another point of view
By Robert Benchley

REDUCING THE RISK 15
New technology gives heart specialists the edge in treatment
By Sue Jeantheau

READ TWO ARTICLES AND CALL ME IN THE MORNING 22
Rush faculty collaborate with World Book on medical encyclopedia

LOOKING FOR CLUES 24
Cancer research at Rush
By Nancy Stetson

MEDICAL STUDENTS PUT HEALTHY INTO THEIR LIFESTYLES 35
Courses zero in on health habits
By Justine Ringhofer

RUSHROUNDS 38
News from the departments

The cover: An examination of the stomach with an endoscope, from an artist's perspective. Illustrated by Heidi Hoffer.

Hard Facts about Gut Feelings

From heartburn to cancer, digestive problems affect millions of Americans

By Cheryl Janusz

With the help of special attachments, Sheldon Sloan, M.D., internal medicine, uses endoscopy for non-surgical therapy.

Digestion? It's not cocktail party conversation or even something we discuss around the office water cooler. But despite our squeamishness about the topic, millions of Americans suffer from digestive tract problems that can range from annoying to devastating... to deadly.

With more effective technologies than ever before, gastroenterologists can diagnose and treat most cases of chronic heartburn, ulcers, irritable bowel syndrome and early gastrointestinal cancer, as well as various complications associated with gallbladder and liver disease. Yet many patients suffer needless discomfort—or worse, risk chronic illness and early death—because they fail to report persistent or unusual symptoms to their doctors. For some people, burning chest pain and gut-wrenching cramps have simply come to be synonymous with eating and digestion.

Digestion and Disease

Digestion is the process by which the body dissolves food, breaking it down into simpler chemicals which are absorbed by the blood and used for energy.

Normally, the organs and glands of the digestive tract work as an efficient assembly line. When we eat, food we swallow drops down the esophagus into the stomach, where it is mixed with gastric juices containing acid and enzymes. In less than an hour, the stomach begins pushing the food through the pyloric sphincter into the duodenum where it is bathed in digestive juices secreted by the liver and the pancreas. From there, the partially digested food travels through the small intestine, where more enzymes break down proteins, fats and starches into food molecules which are absorbed into the bloodstream. Undigested food and waste products move into the large intestine, or colon.

When problems strike, x-ray and other non-invasive techniques such as endoscopy can help gastroenterologists diagnose where and why the digestive process goes

Treatments for digestive disorders range from medication to surgery.

awry. The endoscope is a long, flexible viewing tube containing fiberoptic bundles illuminated by a light at the tip. By passing the tube through the patient's mouth and down the throat, or through the rectum up into the large intestine, a physician gets a close-up look inside and around the esophagus, stomach and duodenum, or rectum and colon, obtaining vital information about the nature and severity of the problem.

With the help of special attachments, endoscopy can also be used for non-surgical therapy. "Endoscopy allows us to stop ulcers from bleeding, remove polyps from the colon, and bypass obstructions throughout the biliary tract, all without making an incision," says Seymour M. Sabesin, M.D., the Josephine Dyrenforth Professor of Gastroenterology and director, Section of Digestive Diseases. "Therapeutic endoscopy has changed the way we treat many digestive diseases."

What are digestive diseases? They include all diseases of the esophagus, stomach, small and large intestines, as well as disorders of the liver, gallbladder and pancreas. Physicians who specialize in the diagnosis and treatment of these disorders are called gastroenterologists.

At Rush, the Section of Digestive Diseases is staffed by 14 gastroenterologists, including several hepatologists who deal exclusively with diseases of the liver, gallbladder and bile ducts. Gastroenterologists at Rush North Shore Medical Center in Skokie offer a similar range of services.

"Diagnosis and treatment is often multidisciplinary, but we've organized the section so that patients get regular basic care from a specialist in their condition. This systematic approach is mutually beneficial: patients get more individualized care and physicians have better opportunities to develop their expertise," says Dr. Sabesin.

Snuffing Out Heartburn

Problems in the esophagus can start soon after eating. It's estimated that 10 percent of us experience occasional mild heartburn, but for some patients heartburn can be persistent and severe.

"Whenever I ate, *whatever* I ate, my chest felt like a volcano that was about to explode. Antacids were no help. At night, I'd actually wake up choking on the acid that was backing up in my throat," recalls 39-year-old Lynette Kinchen.

Kinchen has gastroesophageal reflux, a term for chronic heartburn and its complications. "The burning sensation occurs when hydrochloric acid produced by the stomach to aid digestion splashes up, or refluxes, into the esophagus and burns the delicate esophageal lining," explains John A. Schaffner, M.D., associate professor and senior attending physician, Department of Internal Medicine.

While mild heartburn can usually be relieved with antacids, gastroesophageal reflux often requires more aggressive treatment with prescription medications. Now taking an acid-inhibiting drug, omeprazole, Kinchen happily reports that she is symptom-free.

Most heartburn isn't severe, but some patients, like Kinchen, may develop a complication called *erosive esophagitis*, in which acid refluxed from the stomach begins to break down the lining of the esophagus. If untreated, build-up of scar tissue inside the esophagus can require that the physician use special instruments to dilate—or stretch—the patient's esophagus to permit swallowing. A complication of erosive esophagitis called Barrett's esophagus may even predispose patients to esophageal cancer.

An Exercise in Motility

Sheldon Sloan, M.D., assistant professor, Department of Internal Medicine, is one of a handful of Chicago area doctors who specialize in esophageal motility disorders—problems characterized by poor function or incoordination of the muscles in the esophagus.

John A. Schaffner, M.D., internal medicine, with patient.

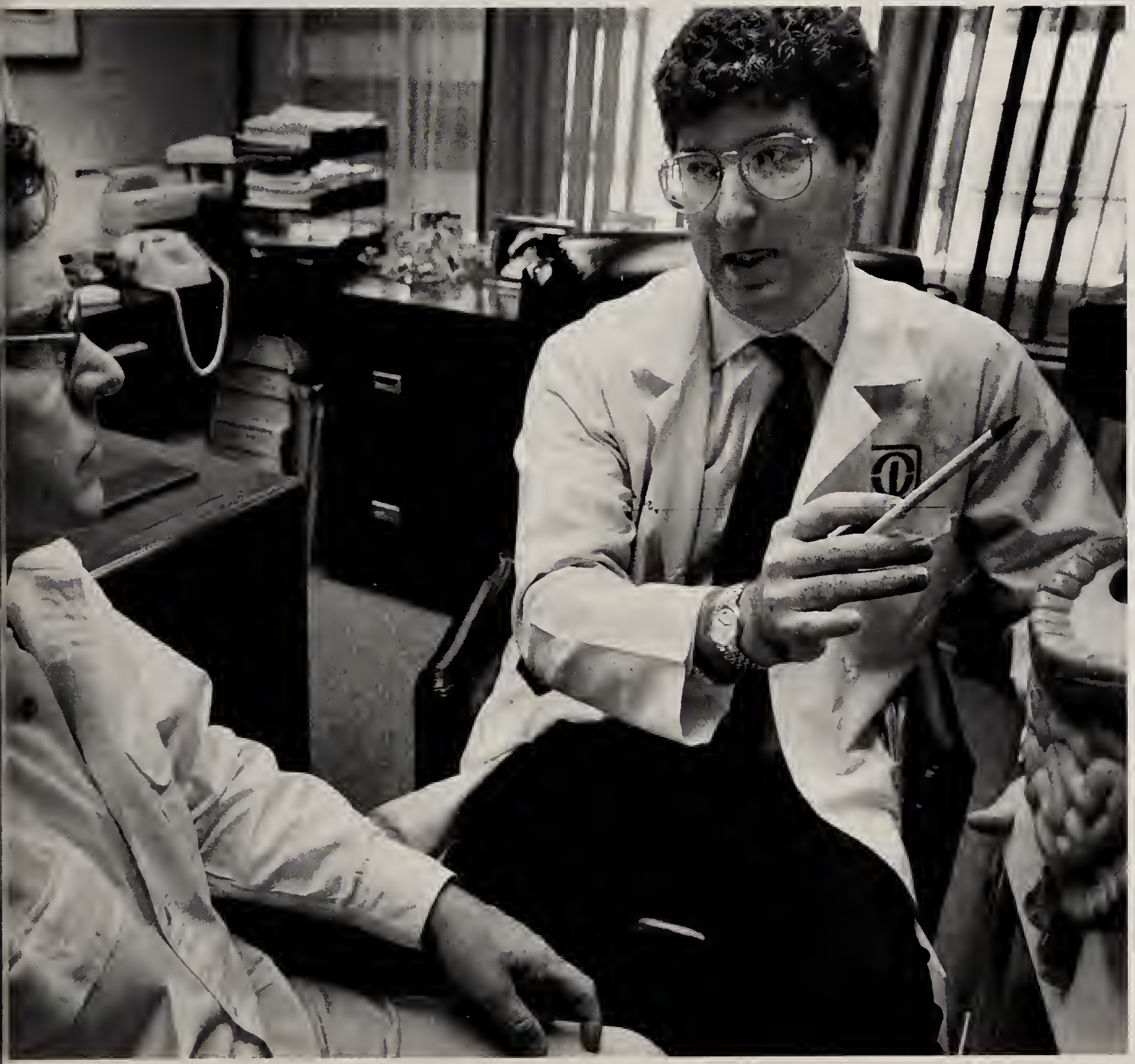
"Whenever I ate, *whatever* I ate, my chest felt like a volcano that was about to explode."

Ordinarily, food is moved through the digestive system by successive waves of involuntary muscle contractions called peristalsis. "When a motility problem interferes with peristalsis in the esophagus, a patient will usually complain about food getting stuck in the throat and chest," explains Dr. Sloan.

Many experts believe that erosive esophagitis is, or at least involves, a motility problem.

"In erosive esophagitis, poor motility in the lower muscles of the esophagus traps acid refluxed from the stomach," Dr. Sloan says. "Acid caught in the esophagus further erodes the lining, worsening the problem."

Since esophageal motility disorders can result in symptoms of chest pain similar to those caused by a heart problem, specific diagnoses are made through tests which measure the amplitude and duration of muscle contractions, as well as the degree of acidity in the esophagus. Treatment can range from medication to surgery.



"We can treat symptoms, but we still don't know what causes motility problems or how they relate to gastroesophageal reflux. Defining these mechanisms is the ultimate goal of our research," says Dr. Sloan.

In this vein, Dr. Sloan is studying the relationship between severe erosive esophagitis and hiatal hernias. "Over 80 percent of people with severe erosive esophagitis have hiatal hernias. This suggests that a hernia somehow contributes to the destruction of the esophageal lining," he says.

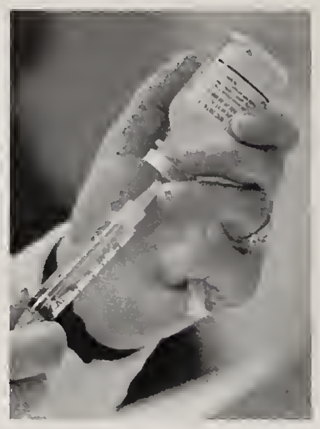
Acid and Ulcers

In the stomach, gastric acid can again wreak digestive havoc. For 32-year-old Beatrice Tankson, trouble began subtly.

"During the night, I'd feel jabbing pains in my abdomen. When I took antacids they'd disappear, so I figured it was just indigestion," she says.

But over time, Tankson's symptoms progressed. Seeking a diagnosis, she was examined by a succession of doctors. "One told me that I had muscle spasms, and still another told me it was gallstones," she recalls. "Meanwhile, I was in agony. None of the treatments they prescribed helped. The pain got to the point where I couldn't eat or sleep."

Finally, an x-ray examination showed that Tankson had a crater-like sore in the lining of her stomach—an ulcer. Referred by a



physician to Rush, she participated, somewhat skeptically, in a drug study.

"When I was told that medication could heal my ulcer, I thought it was just medical talk," admits Tankson. "But two weeks after I started the study, I felt better. In 30 days, my ulcer was completely healed."

It's estimated that one out of 10 of us suffers from an ulcer at some point. Yet, despite their prevalence, ulcers are shrouded in myth. There's no validity, for example, to the common belief that ulcers are caused by psychological stress, or a diet rich in spicy foods, caffeine or alcohol.

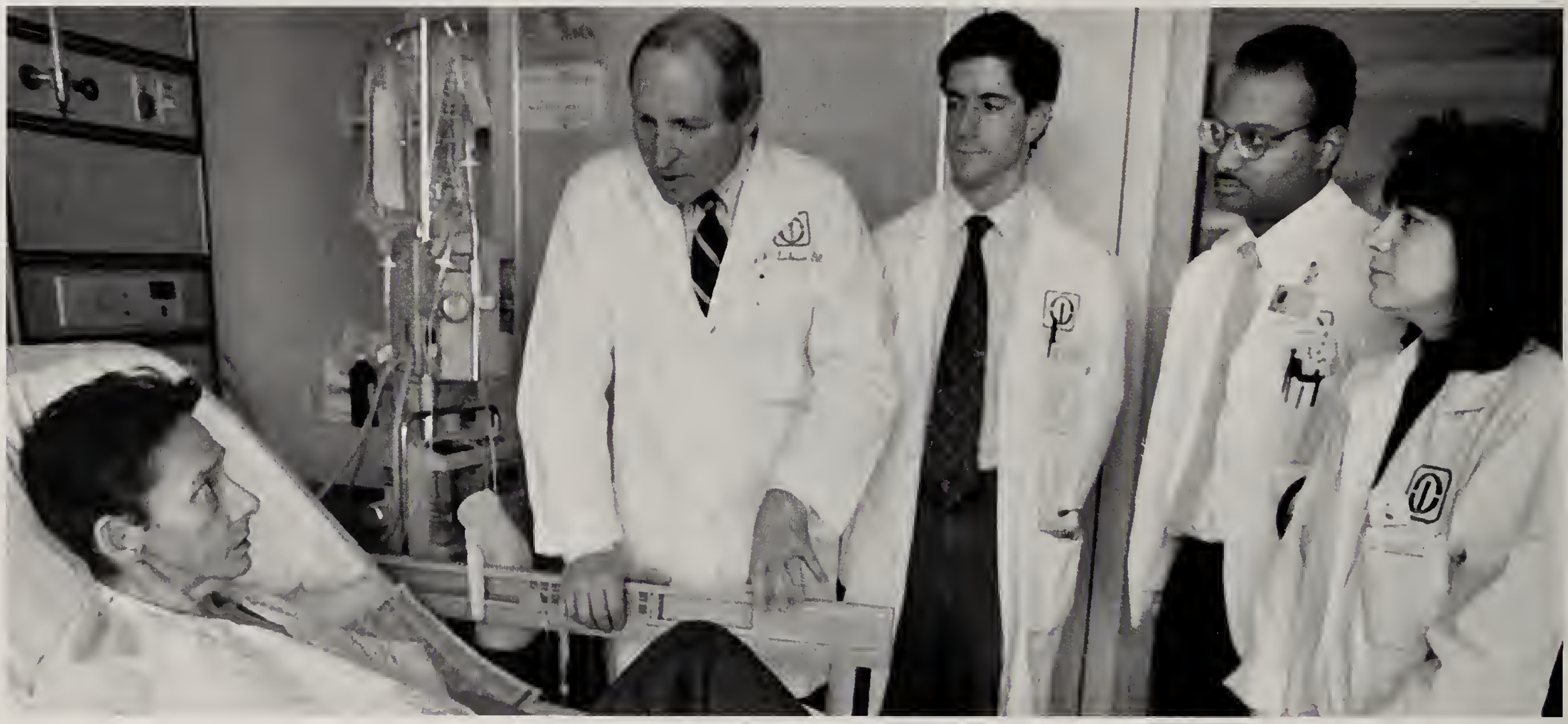
It's also a misconception that ulcers are always benign. Untreated ulcers can, and do, kill thousands of people every year through serious complications such as bleeding, and peritonitis, an infection of the abdominal lining which can occur when an ulcer perforates the stomach wall.

Like esophagitis, ulcers are caused by corrosive hydrochloric acid. "Stomach acid is actually capable of eating through shoe leather," says Dr. Sabesin.

During digestion, glands in the stomach's lining protect the stomach wall by secreting a coat of mucus; this combines with bicarbonate from the pancreas to neutralize powerful digestive acids and the enzyme pepsin.

"It's believed that ulcers occur when there is an imbalance between the aggressive factors of acid and pepsin, and the normal defense factors that prevent acid and pepsin from eating away the stomach lining," explains Dr. Sabesin.

Ulcers can occur throughout the digestive tract, but over 80 percent are duodenal ulcers, which form in the first few inches of the small intestine, called the duodenum. An ulcer that forms in the lining of the stomach is called a gastric ulcer. What triggers ulcer formation? Researchers haven't been able to identify a universal cause, but cigarette smoking, frequent aspirin use and genetic predisposition appear to be key risk factors. Also, ulcers tend to recur.



Seymour Sabesin, M.D., director, Section of Digestive Diseases (left), conducts patient rounds with internal medicine residents.

Fortunately, recent years have seen spectacular advances in ulcer treatment. Under Dr. Sabesin's coordination, the Section of Digestive Diseases continues to play a major role in the clinical study and development of highly effective acid-inhibiting medications. These drugs fall into two groups: H2 receptor antagonists such as cimetidine, and proton pump inhibitors such as omeprazole.

"In upwards of 80 percent of

patients, H2 receptor antagonists heal ulcers in four to six weeks. What's more, with a single daily dose they can prevent ulcers from recurring. Proton-pump inhibiting medications such as omeprazole, while still investigational, help gastroesophageal reflux and rapidly heal ulcers," says Dr. Sabesin. "Needless to say, these medications have revolutionized ulcer treatment."

Soothing the Irritable Bowel

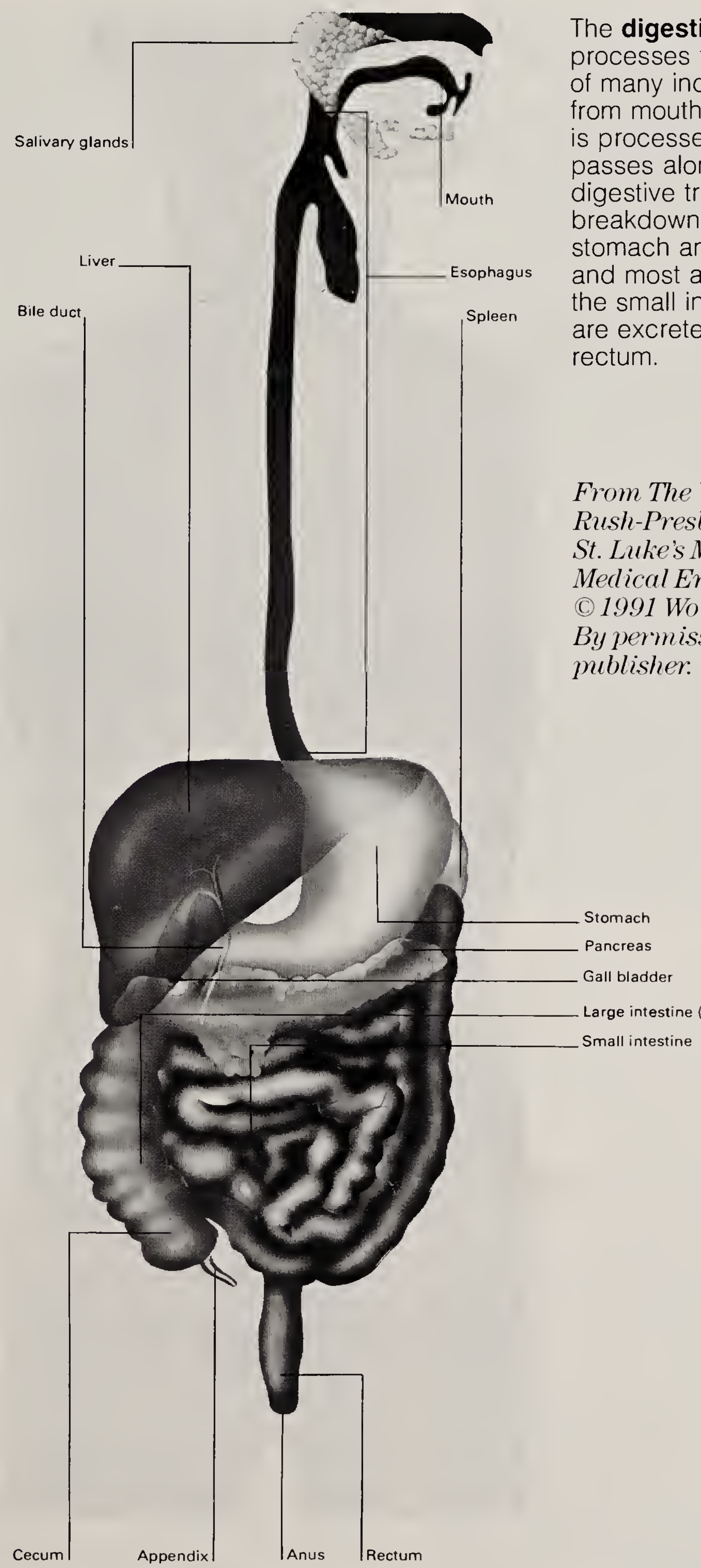
An important function of the last five to seven feet of the digestive tract—the large intestine, or colon—is to conduct undigested food and waste materials out of the body. Any disruption in digestive function can lead to a change in bowel activity.

Affecting an estimated 22 million people, irritable bowel syndrome (IBS) is the most common digestive tract disorder in the U.S. According to Dr. Schaffner, IBS refers not to a specific disease, but to a set of generic symptoms: abdominal pain (caused by spasms in the colon), altered bowel habits, constipation, diarrhea, or constipation alternating with diarrhea.

"IBS can be associated with many factors—stress, poor nutrition, inadequate dietary fiber, even 'allergies' or intolerances to certain foods and additives," says Dr. Schaffner. "Since treatment is tailored to the individual IBS patient, frank discussion between doctor and patient about symptoms is essential to good diagnosis."

Depending on cause and severity of symptoms, some IBS patients benefit from increasing dietary fiber, others from use of bulk agents and still others from antispasmodic agents or other medications.

Patients can find relief in the fact



The **digestive system** processes food by means of many individual organs, from mouth to anus. Food is processed for use as it passes along the digestive tract. Most food breakdown occurs in the stomach and duodenum, and most absorption in the small intestine. Wastes are excreted through the rectum.

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Theodore J. Saclarides, M.D., general surgery.

that IBS isn't life-threatening. "But it's important that people with IBS symptoms see a doctor so that a correct diagnosis can be made and other dangerous illnesses ruled out," says Dr. Schaffner.

The Inflamed Bowel

Inflammatory bowel diseases include Crohn's disease, which can affect any part of the gastrointestinal tract, and ulcerative colitis, which acts upon the colon. Both are characterized by potentially disabling bouts of diarrhea, as well as abdominal pain, weight loss, fever, nausea, vomiting and abdominal distension. Also, both may cause serious complications such as profuse bleeding and rupture or obstruction of the bowel.

Since Crohn's disease and ulcerative colitis involve disturbances of the immune system, about 10 percent of patients may suffer from extra-intestinal symptoms such as joint inflammation, swelling of the eye (iritis), painful skin rashes and liver problems. "Sometimes my joints ache so badly I can barely stand," says Gerald Maloney, a 69-year-old man with Crohn's disease.

How can physicians tell the two disorders apart? A composite of the clinical picture, x-ray findings and colonoscopy, a type of endoscopy performed through the anus, says James L. Franklin, M.D., senior gastroenterologist.

"Colonoscopy, through which the physician is able to view the intestines and, if necessary, obtain a small tissue sample, permits the most precise diagnosis," he adds. Dr. Franklin is a physician/consultant to the National Ileitis/Colitis Foundation and its greater Chicago chapter.

There is no known cause or cure for inflammatory bowel disease, but medications such as antibiotics, corticosteroids and immunosuppressive agents can help to control the inflammatory process. When a patient with chronic ulcerative colitis is regarded at risk for serious complications such as colon cancer, a physician may recommend surgical removal of the colon.

Generally, when the colon is removed, the last part of the small intestine is brought to the abdominal wall, providing an "artificial anus" for the elimination of waste. Many patients today, however, benefit from an innovative technique in which the last portion of the small intestine is brought through the rectum and attached to the anal skin, where the colon previously began. "This allows for bowel movements through the rectum, eliminating the need for a bag at the abdomen," explains Dr. Franklin.

Removing the colon "cures" ulcerative colitis. Even with this surgery, however, Crohn's disease can, and often does, recur in other parts of the gastrointestinal tract. For Maloney, who frequently cancels plans because of disabling cramps and diarrhea, the sense that he is at the mercy of Crohn's disease is frustrating.

"Stomach acid is actually capable of eating through shoe leather."

"I'm a guy who likes to be the controller, not the controllee, and in that sense, Crohn's disease makes me angry," says Maloney. "I want to be the boss, but this illness has more control over my life than I do!"

Fighting Colorectal Cancer

Seventy-year-old Louis Pohnan may owe his life to what was literally a gut feeling. "I wasn't losing blood or feeling any pain, but small changes in my bowel habits made me think that something just wasn't kosher," he recalls. A medical examination revealed a small cancerous tumor on Pohnan's colon.

James L. Franklin, M.D., senior gastroenterologist, discusses a patient's colonoscopy results.

That was nearly 10 years ago. Today, thanks to relatively early detection and successful surgical treatment, Pohnan is fine. "I'm now convinced of the value of regular colon tests, especially for people over age 50," he says. "Early detection is better for your prognosis than the best surgeon."

Dr. Schaffner agrees: "Detected early and treated promptly, cancer of the colon and rectum is one of the most treatable forms of cancer."

But early colorectal cancer has no symptoms to signal the need for testing, so few people take advantage of screening for early detection. "Colorectal cancer just isn't something that most of us like to think about. Before my cancer, *I* never had regular tests—and I had an older brother who died of colon cancer," admits Pohnan.

When cancer is diagnosed, various treatment options are available to patients. Through the Rush Cancer Center, a gastrointestinal malignancy program focuses on the treatment of patients with various gastrointestinal cancers, including colorectal cancer.

"We offer a team approach to cancer treatment. Patients who come to Rush are seen by an oncologist, a gastroenterologist, a surgeon and a radiation therapist. Together, this team devises the most effective plan for each indi-

Audrey Silver, R.N. (right), teaches hepatitis patients how to give themselves interferon injections.

vidual patient,” says Dr. Schaffner.

Surgery, sometimes combined with radiation therapy, is usually the most effective treatment. While traditional surgery involves removal or resection of the colon, the trend in tumor removal is toward less invasive techniques.

Two of the newest minimally invasive procedures, transanal endoscopic microsurgery (TEM) and laparoscopic colotomy and polypectomy, are useful for colon and rectal tumors which could otherwise only be removed with major surgery. Theodore J. Saclarides, M.D., assistant professor and assistant attending physician, general surgery, is one of a growing number of U.S. surgeons trained in these techniques.

TEM employs a specially designed endoscope called a rectoscope to remove rectal polyps and certain cancers of the rectum and sigmoid (the part of the colon immediately above the rectum). “Excising a lesion through the anus isn’t new, but TEM appears to be effective for lesions that elude our other techniques. Because of the rectoscope’s length—20 centimeters—we can reach lesions that are very high up and remove larger lesions more precisely,” says Dr. Saclarides.

In laparoscopic colotomy and polypectomy, the surgeon uses a laparoscope—a surgical instrument which includes an optical system for viewing inside the abdomen and around the colon—to remove selected benign polyps which cannot be removed with colonoscopy. During laparoscopy, a colonoscope inserted into the colon locates the polyp; then the polyp is removed through a small incision in the colon.

New Defense against Liver Disease

Each year, 27,000 Americans die of chronic diseases of the liver, in which normal liver cells are damaged and replaced by scar tissue. When liver disease is untreated, liver function gradually declines until the organ is no longer able to perform life-sustaining functions such as the production of blood-clotting factors, proteins, bile and enzymes, and the elimination of toxic materials.

“With our current knowledge, many liver diseases can be prevented, or at least discovered and treated in their early stages,” says Donald M. Jensen, M.D., associate professor and chief of clinical hepatology.

Through the Rush Hepatology Service, hepatologists Dr. Jensen and Howard J. Rosenblate, M.D., associate professor and attending physician, internal medicine, attempt to detect potentially destructive diseases such as viral hepatitis *before* extensive liver damage occurs.

The history of hepatology at Rush goes back to the early 1960s, when Rush researchers were the first in the world to transmit human hepatitis to an experimental animal, which provided a model for clinical investigation. Today, there are at least five known types of viral hepatitis, each caused by a different virus. Most common are hepatitis A (infectious hepatitis),

"Before interferon, there was no treatment for chronic hepatitis—we've made a major breakthrough."

hepatitis B (serum hepatitis) and hepatitis C.

Most hepatitis is acute and causes no long-term problems. "Hepatitis that persists for over six months, however, is considered chronic, and it can have serious medical implications," explains Dr. Rosenblate. "Hepatitis A is never chronic. Hepatitis B becomes chronic 10 percent of the time; hepatitis C, 50 percent of the time."

All viral hepatitis is contagious. Hepatitis A is spread through contaminated food, water, raw shellfish—even contaminated hands and utensils. Hepatitis B and C are transmitted through sexual contact, blood transfusions, contaminated needles, or from mother to baby at birth.

Often, the illness can be dangerously subtle. "I was more tired than usual, but I never was jaundiced or felt extremely sick. I thought I had the flu," says 59-year-old Dan Ramsey (not his real name), who has chronic hepatitis B. But regardless of symptoms, untreated hepatitis can permanently damage the liver.

While vaccines have been developed to help *prevent* hepatitis infection in high-risk individuals such as IV drug users and health care workers, there has been little that physicians could do for patients with chronic hepatitis. But now an investigative treatment called interferon appears to be changing this gloomy picture.

Donald M. Jensen, M.D., chief of clinical hepatology.

"Interferon is actually a chemical produced by our bodies to eradicate viral infections," says Dr. Jensen. As a treatment for chronic hepatitis, interferon packs a double whammy: it inhibits the replication of viruses within cells and it enhances the body's natural immune mechanisms for fighting viral infections.

Ramsey is one of several hundred patients nationwide undergoing therapy with genetically engineered interferon for chronic hepatitis. Although interferon's side effects (fever, chills, headache) sometimes force him to modify his activities, Ramsey says, "It's well worth the discomfort if it produces a cure."

Interferon is potentially toxic; therefore, study coordinator Audrey Silver, R.N., closely monitors each patient's progress. Results indicate that after six weeks of interferon therapy, 50 percent of patients show a decrease in their liver enzyme level—a good signal that hepatitis is in remission. So far, Ramsey's tests indicate that he is in that lucky group.

Of those patients with good initial response to interferon, half will experience lasting benefits; the other half will relapse and require more interferon treatments. "We're still searching for ways to predict patients' response to interferon. This knowledge will allow us to provide more effective, individualized treatment," says Dr. Jensen. "But before interferon, there was *no* treatment for chronic hepatitis. In that context, we've made a major breakthrough."

When liver disease severely diminishes liver function and the patient's life is threatened, liver transplant may be the best option. Rush hepatologists work closely with liver transplant surgeons, following transplant patients before and after surgery.

Assisted by interventional radiologists, hepatologists are able to use therapeutic endoscopy to treat common post-transplant complications such as narrowing of the bile duct. By avoiding additional surgery, this technique can shorten the transplant patient's hospital stay.

"Collaboration between specialists in digestive diseases, transplant surgery and radiology enables Rush to offer a multi-specialty approach to liver disease that is unique," says Dr. Jensen. "We believe this approach benefits our patients."

Winning the War against Gallstones

In addition to pain and indigestion, many gallstone patients contend with drastic dietary restrictions. "I loved spicy Mexican food," says 63-year-old Patricia Wellert, "but

The Romance of Digestion

By Robert Benchley

Unlike the accompanying article, based on research and the latest clinical advances, humorist Robert Benchley's visit to the same topic earlier in the century is airily indifferent to scientific constraints, and serves to remind us how far we have progressed. Or have we?

When you take a bit of that delicious cookie, or swallow a morsel of that nourishing bread, do you stop to think of the marvelous and intricate process by means of which Mother Nature is going to convert it into bone and sinew and roses for those pretty cheeks? Probably not, and it is just as well. For if you did stop to think of it at that time, you would unquestionably not be able to digest that cookie—or that nourishing bread.

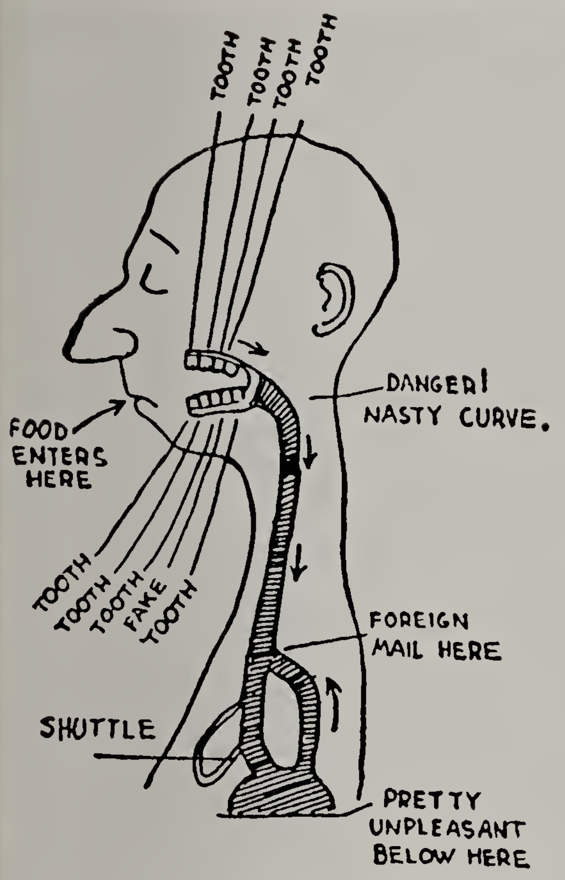
But whether you think of it or not this exciting process of digestion is going on, day in and day out, sometimes pretty badly but always with a great show of efficiency. It is, on the whole, probably one of the worst-done jobs in the world.

First you must know that those hard, white edges of bone which you must have noticed hundreds of times along the front of your mouth, are "teeth," and are put there for a very definite purpose. They are the ivory gates to the body. They are Nature's tiny sentinels, and if you have ever bitten yourself, you will know how sharp they can be, and what efficient little watchmen they are. Just you try to slip your finger into your mouth without your teeth's permission, and see how far you get. Or try to get it out, once they have captured it.

Now these thousands of brave little soldiers, the teeth, which we have in our mouths, take the food as it comes through the air (in case you are snapping at a butterfly) or from the fork, and separate it into its component parts (air, land and water). In this process, the teeth are aided by the tongue, which is that awful-looking thing right back of your teeth. Don't look at it!

The tongue (which we may call the escalator of the mouth or Nature's nobleman for short), and the teeth toss the food back and forth between them until there is nothing left of it, except the little bones which you have to take out between your thumb and forefinger and lay on your butter-plate. In doing this be careful that the bone is really on the butter-plate and that it does not stick to your finger so that you put it back into your mouth again on the next trip, for this would make the little white sentries very angry and they might all drop out.

And now comes the really wonderful part of the romance which is being enacted right there under your very eyes. A chemical reaction on the tongue presses a little button which telegraphs down, down, down, 'way down to the cross old Stomach and says: "Please, sir, do you want this food or don't you?"



Cross section of human food duct, showing ludicrous process of self-styled "Digestion"

And the Stomach, whom we shall call "Prince Charming" from now on, telegraphs (or more likely writes) back: "Yes dear!" or "You can do what you like with it for all of me." Just as he happens to feel at the time.

And then, such a hurry and bustle goes on in the mouth! "Foodie's going to visit Stomach!" all the little teeth cry, and rush about for all the world as if they were going themselves. "All aboard, all aboard!" calls out the tongue, and there is a great ringing of bells and blowing of whistles and bumping of porters and in the midst of it all, the remnants of that delicious cookie seated nervously on the tongue, ready to be taken down on its first journey alone, down to see Prince Charming. For all the joyousness of the occasion, it is a little sad, too. For that bit of cookie is going to get some terribly tough treatment before it is through.

The food is then placed on a conveyor, by means of which it is taken to the Drying Room, situated on the third floor, where it is taken apart and washed and dried, preparatory to going through the pressing machines. These pressing machines are operated by one man, who stands by the conveyor as it brings the food along and tosses it into the vats. Here all rocks and moss are drawn off by mechanical pickers and the food subjected to treatment in a solution of sulphite, a secret process which is jealously guarded. From here the food is taken to the Playroom where it plays around awhile with the other children until it is time for it to be folded by the girls in the bindery, packed into neat stacks, and wrapped for shipment in bundles of fifty. Some of these bundles, the proteins, are shipped to the bones of the body, others, the hydrates, go to making muscle, while a third class, the sophomores, contribute to making fatty tissue which nobody wants, that is, not if he has any pride at all about his appearance. The byproducts are made into milk-bottle caps, emery wheels, and insurance calendars, and are sold at cost.

Thus we see how wonderfully Nature takes care of us and our little troubles, aided only by soda-mint and bicarbonate.

From the book INSIDE BENCHLEY by Robert Benchley. Copyright (c) 1942 by Harper & Brothers; renewed 1970 by Gertrude D. Benchley. Reprinted by permission of Harper Collins Publishers.

with gallstones, it seemed that I couldn't eat anything that was rich or had any 'kick.' Even orange juice would set my symptoms off."

For the 20 million Americans who suffer from gallstones, Wellert's situation may be familiar. Symptoms—upper abdominal pain, nausea and indigestion—often occur following a meal high in fat or acidity. Yet, diet has little to do with the formation of stones.

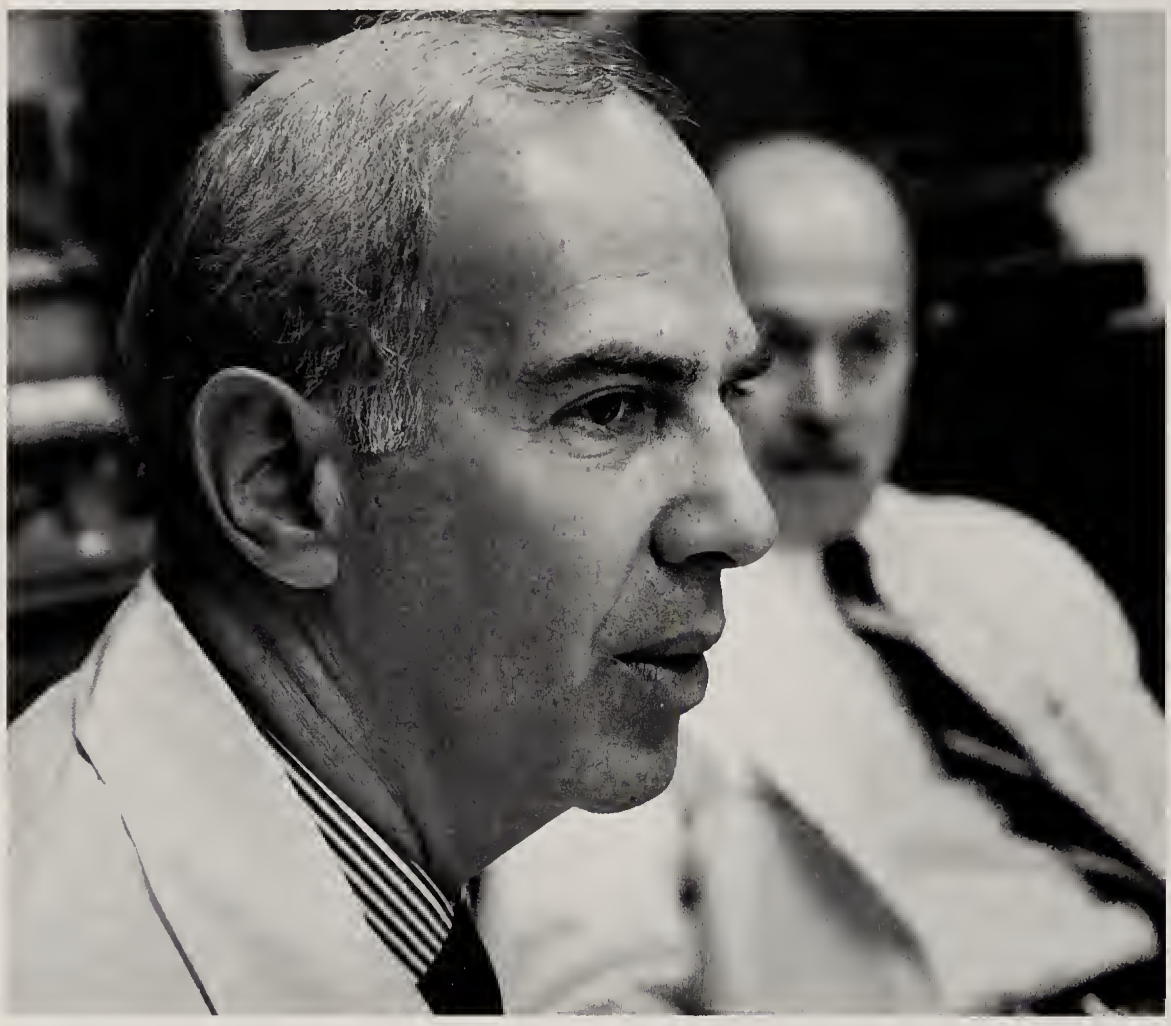
What does cause gallstones? Obesity and/or rapid weight loss tend to increase the risk. Others may inherit a predisposition to gallbladder disease.

"Cholesterol, which is secreted by the liver, is normally dissolved in the bile that drains from the liver into the gallbladder," Dr. Jensen explains. "Some people, however, by virtue of their genetic make-up, secrete too much cholesterol and produce too little bile. When the bile becomes too enriched in cholesterol, the fat precipitates into crystals, which cluster together to form stones."

It's estimated that 10 percent of the population suffer from gallstones at some point, but only five percent experience symptoms. "The stones that ultimately cause discomfort are those that become lodged in the ducts that drain bile from the liver," says Dr. Jensen.

There are two types of gallstones: cholesterol and pigment. Less-soluble pigment stones account for 20 percent of all gallstones. "The only way to treat pigment stones is to remove the gallbladder," says Dr. Jensen.

For patients with cholesterol stones, however, innovative medications and procedures offer hope for effective, non-invasive treatment. Rush is among the leading medical centers testing and apply-



Hepatologist Howard J. Rosenblate, M.D. (left), works closely with the liver transplant team, headed by James W. Williams, M.D. (right).

ing a number of new technologies.

One treatment, ursodiol, is an oral medication that replaces a patient's natural bile acids, allowing cholesterol stones to dissolve slowly. Approved by the FDA last year, ursodiol is effective, convenient and virtually free of side effects.

For patients like Wellert who don't respond to medication alone, an investigational procedure called lithotripsy provides another nonsurgical option. In lithotripsy, repeated sound waves, precisely focused on stones within the gallbladder, break the stones apart. Ursodiol is then administered to dissolve the stone fragments that remain in the gallbladder.

"I'd recommend lithotripsy to anyone," says Wellert, who, after three sessions of lithotripsy and treatment with ursodiol, was pronounced "stone-free." A lithotripter—one of only three in the Chicago area for the treatment of gallstones—is housed at Rush North Shore Medical Center in Skokie.

When cholesterol stones are exceptionally large or the gallbladder is inflamed, surgery to remove the gallbladder (called cholecystectomy) is the best option. According to Dr. Jensen, a new minimally invasive technique, laparoscopic cholecystectomy, is "virtually changing the field of gallstone treatment."

Using a laparoscope, an instrument which provides a view of the inside of the abdomen, a surgeon is able to remove the gallbladder through a small incision, usually through or around the navel. "Muscles and nerves aren't cut, so less time is required to heal," says Dr. Jensen. The recovery time for conventional surgery is four to six weeks. After laparoscopy, most people return to work in three days.

Gastroenterologists view the move towards less invasive treatments as an exciting medical trend. Most patients, however, are simply grateful that they don't have to undergo surgery.

"I put off treatment for a year to avoid an operation," says Wellert. "Now, I'm fine. I can even eat Mexican food again—the hotter the better!"

A Look Ahead

What's ahead in digestive diseases? Dr. Sabesin and members of his staff are currently involved in many exciting avenues of clinical and laboratory research. Areas of study include mechanisms of liver injury, and medications that can treat the symptoms and halt progression of chronic liver disease.

Despite new, effective medications and major therapeutic advances such as endoscopy, Dr. Sabesin acknowledges that we have much to learn about the *process* of most digestive diseases.

"We can avoid a lot of surgery, we can treat the symptoms of a host of digestive disorders, and we can even prevent many symptoms' recurrence, but we still can't prevent or cure most digestive diseases," concludes Dr. Sabesin. "Learning how to eradicate the diseases themselves is our most important research frontier."

Reducing the Risk

New technology gives heart specialists the edge in intervention and treatment

By Sue Jeantheau

Heart disease remains the number one killer in the United States, but statistics show a downward trend. Since 1968, the mortality rate from heart disease has decreased 35 to 40 percent. Lifestyle accounts for some of the change. Smoking is down. Exercise is up. And we are watching diet and cholesterol more carefully than ever.

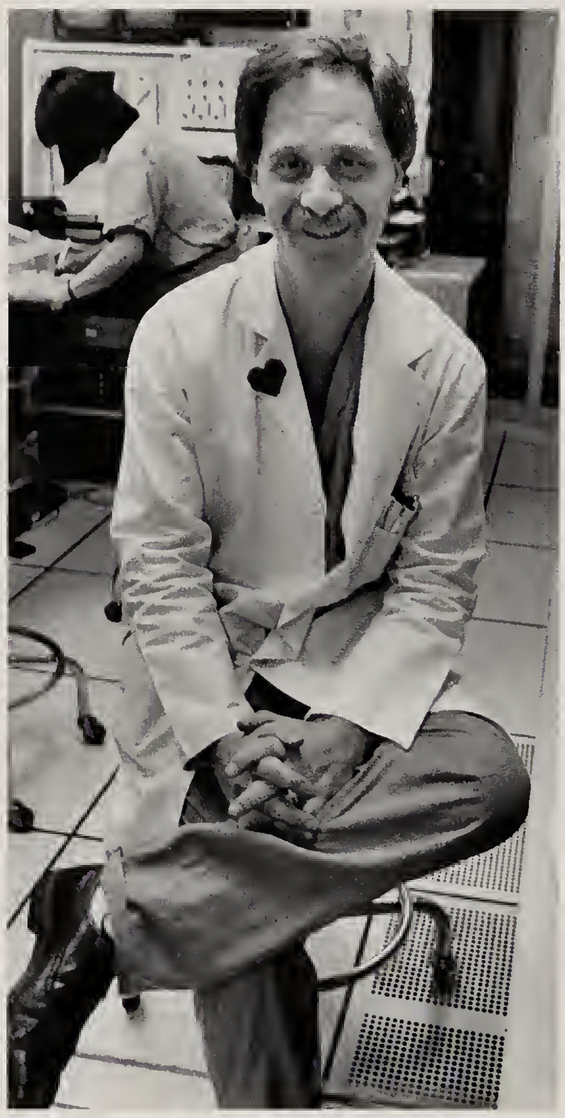
"In addition, new technologies and procedures have changed the focus in cardiology from diagnosis to intervention and treatment," says Joseph Parrillo, M.D., the James B. Herrick Professor of Heart Research and medical director of the Rush Heart Institute.

"Balloon angioplasty and catheter ablation technology have revolutionized cardiology. Invasive catheters can be guided to different places in the heart to mechanically open coronary vessels or interrupt dangerous arrhythmia pathways in the heart," explains Dr. Parrillo. "The patient benefit is enormous since these procedures can produce results without resorting to a surgical procedure."

The Rush Heart Institute, which will officially open in summer of 1991, "will have the conventional tools and treatments available and then take the next few steps beyond to search for the causes and cures of heart disease," Dr. Parrillo says. "Our research will move ahead with studies of new catheters, antiarrhythmic drugs, lipid-lowering agents, and thrombolytic medications for heart attacks, to name a few areas.

"Many patients have serious problems that cannot be handled

Gary Schaer, M.D., is one of the Rush cardiologists testing an innovative method for clearing blocked arteries using laser angioplasty.



Lloyd Klein, M.D., director of interventional cardiology.

by conventional medical interventions, and some of this new, not yet fully proven technology may significantly help such patients.

"The Rush Heart Institute plans to specialize in conducting clinical investigations that allow the newest technologies to be applied to patients who need them."

Laser Technology First in Chicago

Excimer laser coronary angioplasty (ELCA) is a technique to remove the cholesterol plaque deposited in coronary arteries. The build-up narrows the arteries, slowing and possibly stopping circulation. In ELCA, a fiberoptic catheter administers ultraviolet energy which vaporizes the plaque.

"It's still a research technique, but we see it as a real advance," says Gary Schaer, M.D., associate professor of medicine and director of the cardiac catheterization laboratory.

Last October, Rush cardiologists became the first and only investigators in Chicago to use the Advanced Interventional Systems, Inc., DYMER™ 200+ Excimer Laser Angioplasty System in human coronary arteries. Rush is one of 32 centers nationwide involved in a trial of the laser which the Circulatory System Devices Panel of the Food and Drug Administration has recommended for full approval.

In some cases, ELCA may serve as an alternative to balloon angioplasty. Balloon angioplasty is a technique in which a small balloon attached to the end of a catheter is inflated inside a vessel, pushing plaque against the vessel's walls, clearing the blockage. "The potential advantage of laser angioplasty over standard balloon angioplasty is in clearing long blockages, highly calcified plaques or lesions at the beginning of the arteries," says Lloyd Klein, M.D., associate professor of medicine and director of interventional cardiology.

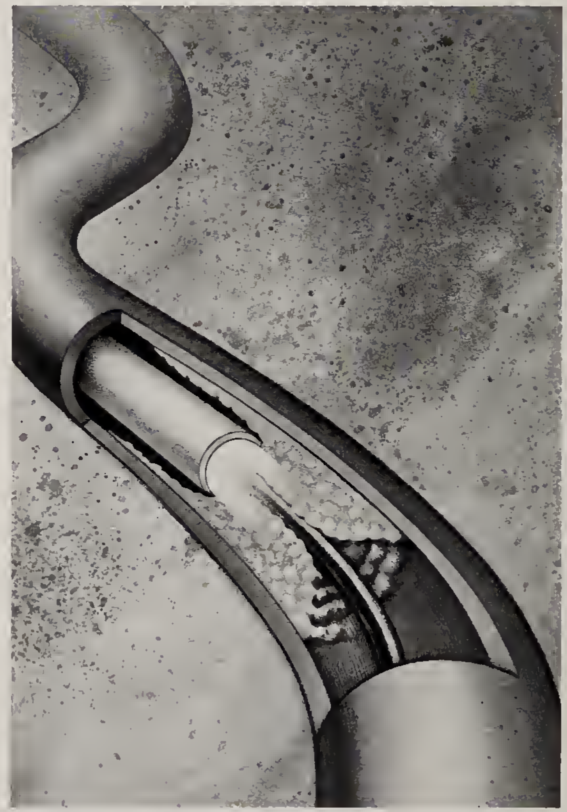
The new technology improved John Presti's condition. The 60-year-old owner of a telecommunications equipment repair firm, Presti believed he had clogged arteries when he started experiencing chest pain last February. "I had shortness of breath, and I sweat while I ate," he remembers. Seven or eight months later, after he failed stress tests, Presti came to Dr. Klein for treatment.

Presti's angiogram showed three vessels with 90 percent blockage. Dr. Klein cleared two of the vessels with the balloon, and the third with the excimer laser.

Because of the condition of the third lesion, "he was a perfect candidate for the laser," says Dr. Klein. "There were three branches coming out of the lesion, which would have been difficult to clear using the balloon procedure because each branch would have to be protected." The delicate laser did not disturb the branches.

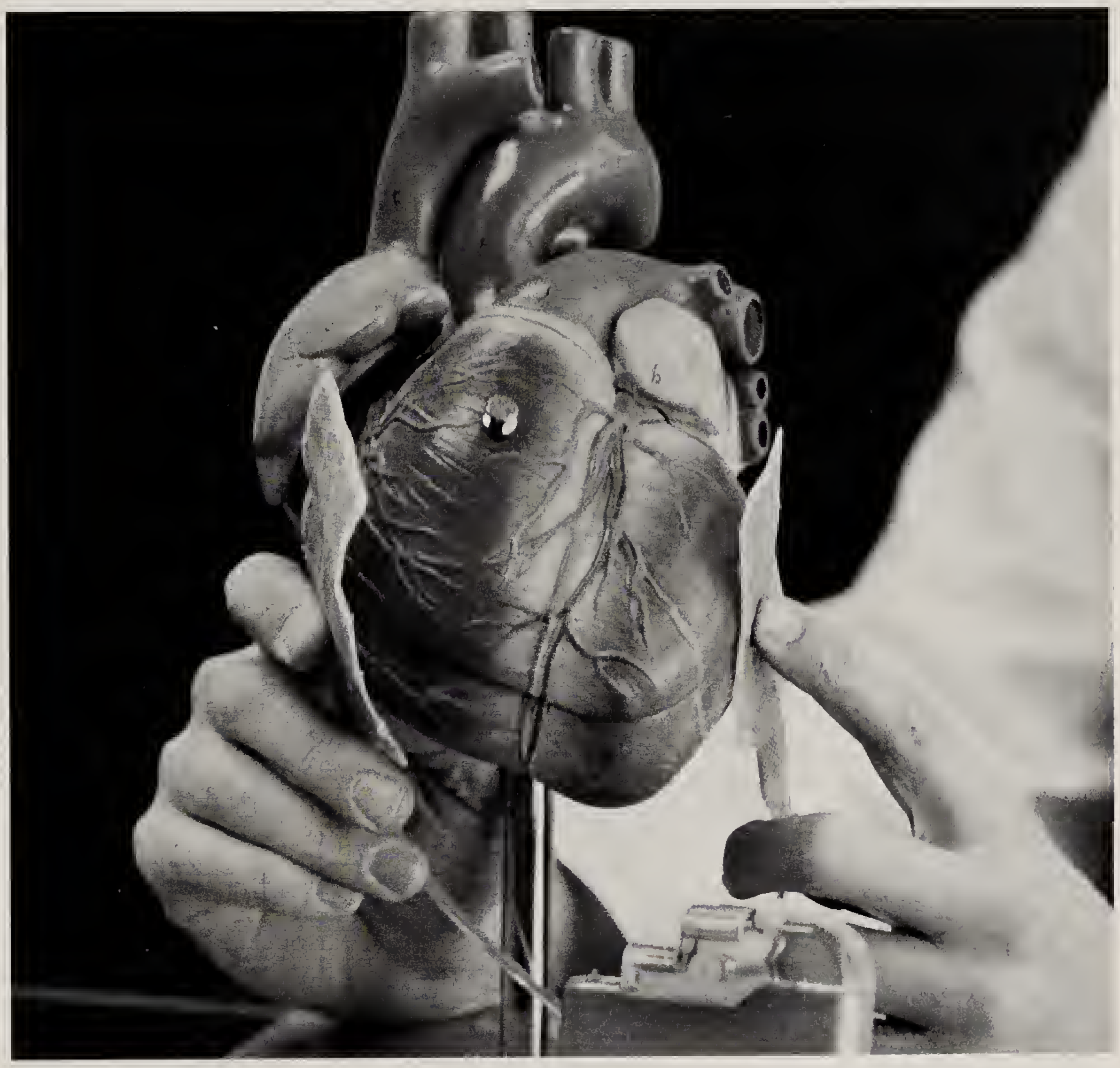
Presti came in on a Thursday, had the procedure Friday and went home Saturday. He went back to work Monday, and the following week went deep-sea fishing in Key West, Florida, feeling great. "There was no discomfort with the laser. I wish I could have had all three blockages taken care of that way," Presti says.

Dr. Schaer emphasizes that while



New laser technology enables the removal of cholesterol plaque from coronary arteries with a fiberoptic catheter.

A model of the human heart shows the Cadence® implantable defibrillator in place.



there is call for optimism about the excimer laser, each situation must be carefully evaluated. "As with any new procedure, it's experience that tells you what its benefits and limitations are," he says.

Regulating Rhythms

A half million people die each year from sudden death due to arrhythmia, an irregular heartbeat. While drug therapy is generally used to control arrhythmias, certain cases, depending on the location and the severity of the arrhythmia, can benefit from two new treatments.

A device called a defibrillator can interrupt the irregular beating of the heart, return it to normal rhythm and avert a potential heart attack. Defibrillators are generally used for ventricular arrhythmias, those occurring in the lower chambers of the heart. "When the heart develops a rapid rhythm, the device detects it and delivers an electric shock, which sends the heart back to normal and prevents cardiac arrest," explains Thomas Buckingham, M.D., associate professor of medicine and director of electrophysiology and pacemaker services.

Of late, Dr. Buckingham has been working with the Cadence® implantable defibrillator, a miniature computer which is surgically implanted in patients with sustained arrhythmias. This device paces the patient's heart back to normal rhythm instead of delivering a shock. "If a shock is required, this device can give initial shocks of lower intensity than those of previous devices, so there's less discomfort," says Dr. Buckingham.

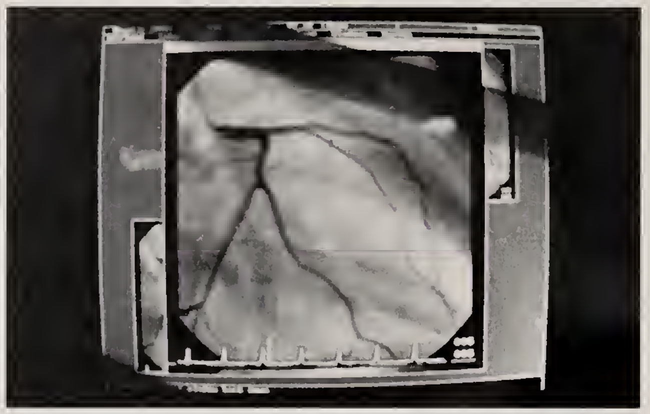
For irregularities in the upper chambers of the heart, an alternative treatment may provide a cure. It's called catheter ablation.

Jennifer Brands, a 33-year-old housewife and mother of two, for years suffered from a tachycardia, a fast heart rhythm, that caused great anxiety and pain. Brands was unable to lift her children, and her frequent attacks made her concerned for her husband. "I was afraid for what he would go through if something happened to me," she says.

Doctors diagnosed her arrhythmia at age 21, and prescribed a variety of medications to treat the condition. At 33, as the asthma medication she also needed further worsened her tachycardia, Brands wanted a cure. "I remember thinking, 'I'm young, and I want to get this taken care of now! I want to be healthy and *happy*!'" says Brands.

Her cardiologist referred her to Dr. Buckingham, who suggested catheter ablation. "We reserve catheter ablation for patients who either fail to respond to antiarrhythmic medicines or experience side effects from these medicines," says Dr. Buckingham.

In catheter ablation, a nonsurgical technique which Rush first offered last August, catheters map the heart and pinpoint the location of the arrhythmia, which in some instances may originate from more than one area. The cardiologist inserts a catheter delivering radio-



frequency energy at the exact point of the arrhythmia. The energy destroys that area of the heart, averting further arrhythmias.

Brands found the procedure fascinating. "I could read my own EKG as the cardiologists and nurses worked," she recalls. "I felt a 'pop' in my chest and knew that they hit the right spot because at that exact moment, the EKG was perfect; I went right back to normal rhythm," she recounts excitedly.

"I feel alive. It's a whole new life. I'm not in fear of death anymore," says an arrhythmia-free Brands.

An Inside Look

One of the latest technologies used to spot arterial vessel defects sounds like it comes straight from the movie scripts for "Fantastic Voyage" or "Innerspace." Tour the inside of an artery! There's a tear! There's a clot! Look at the plaque!

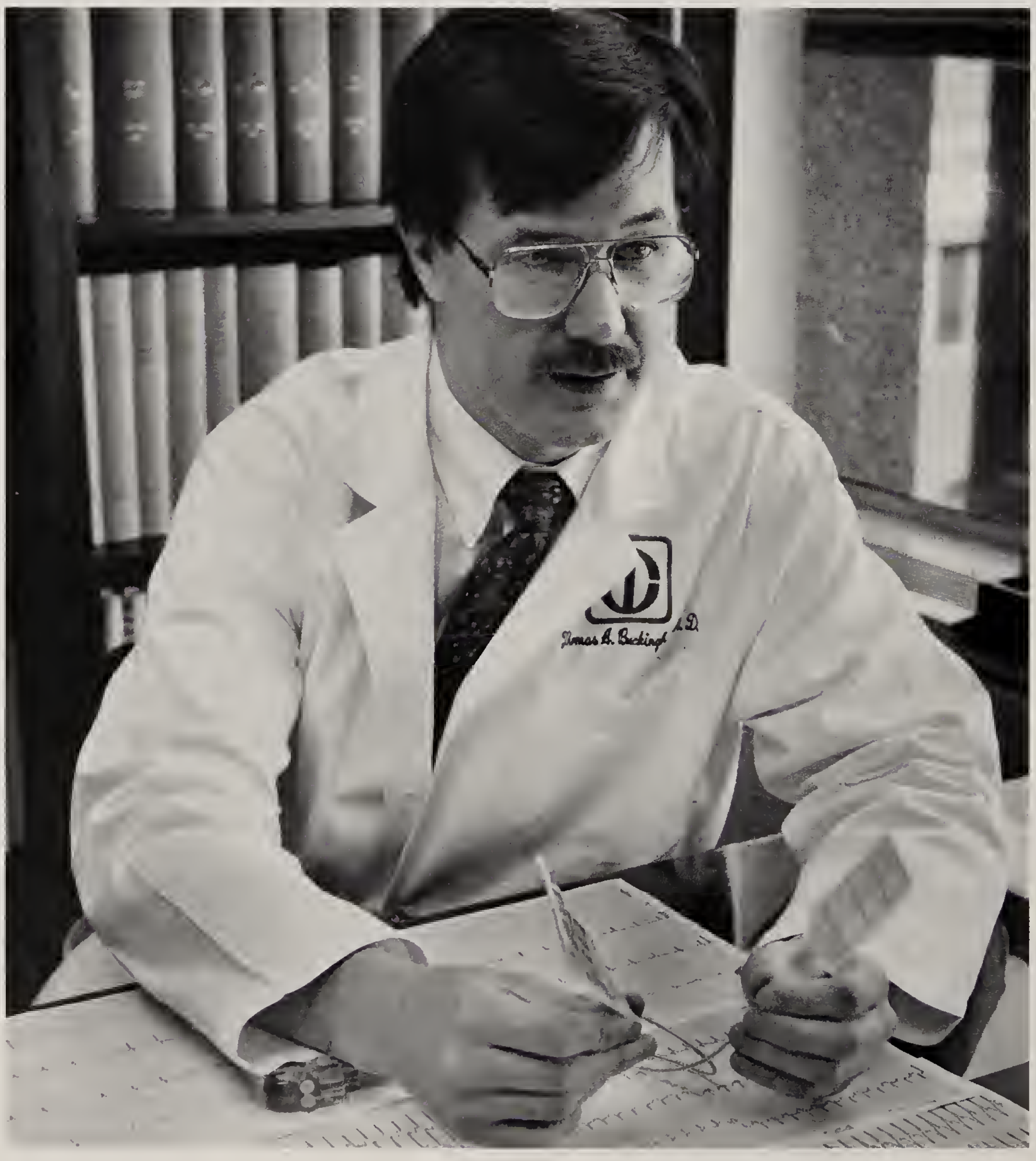
"We're impressed," says Dr. Klein in reference to intravascular ultrasound, a diagnostic tool allowing a cardiologist to "see" the inside of coronary arteries with ultrasound-generated pictures.

An intravascular ultrasound procedure is similar to a regular angioplasty procedure. "The difference is that there is no balloon on the end of the catheter," explains Dr. Klein. "Instead, inside the catheter there's a rotating, motorized shaft that spins several hundred times a minute, and at the tip of the shaft is an ultrasound crystal which sends out and catches ultrasound beams."

A computer program synthesizes the one-dimensional ultrasound images to form a three-dimensional image of the vessel's interior. The computer operator can rotate or magnify the image, and can even show the outside image of the vessel as seen from the inside. The computer helps analyze the abnormalities in a vessel, the structure of lesions, the significance of a vessel's stenosis (narrowing) and the heart's ventricular function. The tool has a striking level of acuity; its precise images, in one patient's case, revealed an unexpected danger.

In 1982, Damon Smith experienced a heart attack. He underwent bypass surgery which markedly improved his condition. But in early July of 1990, Smith went to a routine physical complaining of heaviness in his chest. Testing revealed a 95-98 percent blockage in the bypass area. Dr. Klein performed balloon angioplasty, but three months later, the symptoms returned.

Dr. Klein did an angiogram which confirmed restenosis, a recurrence of narrowing, in the bypass. But the restenosis had an unusual appearance and, based on Smith's symptoms, Dr. Klein proposed


Thomas A. Buckingham, M.D.

Thomas Buckingham, M.D., director of electrophysiology and pacemaker services.

using intravascular ultrasound to zero in on the problem.

The ultrasound revealed a surprise—a blood clot, close to the area of the bypass. "It was something too insignificant for the angiogram, but easily registered by the ultrasound," notes Dr. Klein. The ultrasound results led him to make a different treatment decision.

Prior to the ultrasound, Smith agreed to have laser angioplasty performed (rather than balloon angioplasty) to remove any plaque Dr. Klein may have found. However, the laser is not recommended for removing blood clots; thus Smith underwent a second balloon procedure. The treatment was successful, and Smith is now symptom-free.

Intravascular ultrasound also has research applications. Cardiologists will research the effect of exercise on the heart muscle. As the patient exercises, ultrasound will be used to detect the areas of the muscle that are not getting enough blood. Cardiologists will also use the ultrasound to study artherosclerotic plaque and its effect on coronary regression.

> **"I feel alive. It's a whole new life. I'm not in fear of death anymore."**

"We believe the ultimate applications for this technique are open to discovery," says Dr. Klein. "We have the equipment; now it's just a matter of imagination as to what we can do with it."

Another tool that provides spectacular views is transesophageal echocardiography. The complex name refers to a 15-minute nonsurgical procedure that allows a cardiologist to view the heart through the esophagus and look for abnormalities such as clots, infections, tears in the aorta and leaks in prosthetic valves. "Transesophageal echocardiography is a definitive approach to look for defects," says Philip Liebson, M.D., professor of medicine and director of the cardiovascular echocardiography laboratory.

During the procedure, the sedated but awake patient swallows a tube-like probe. The probe contains an ultrasound crystal, which generates vivid pictures of the heart from its location in the esophagus, directly behind the heart. The cardiologist can adjust the probe to focus on different regions. The echocardiographic equipment enables the cardiologist to zoom in on these regions and note any abnormalities.

In addition to outpatient use, surgeons can also use the equipment in the operating room for valve or valve repair surgery. "They can evaluate the valve function before the patient leaves the operating room to make sure there aren't other things that need to be handled," says Dr. Liebson.

Cardiologists can "see" the inside of coronary arteries and spot defects with a new diagnostic tool that uses ultrasound to generate three-dimensional photos.

Reducing Risk

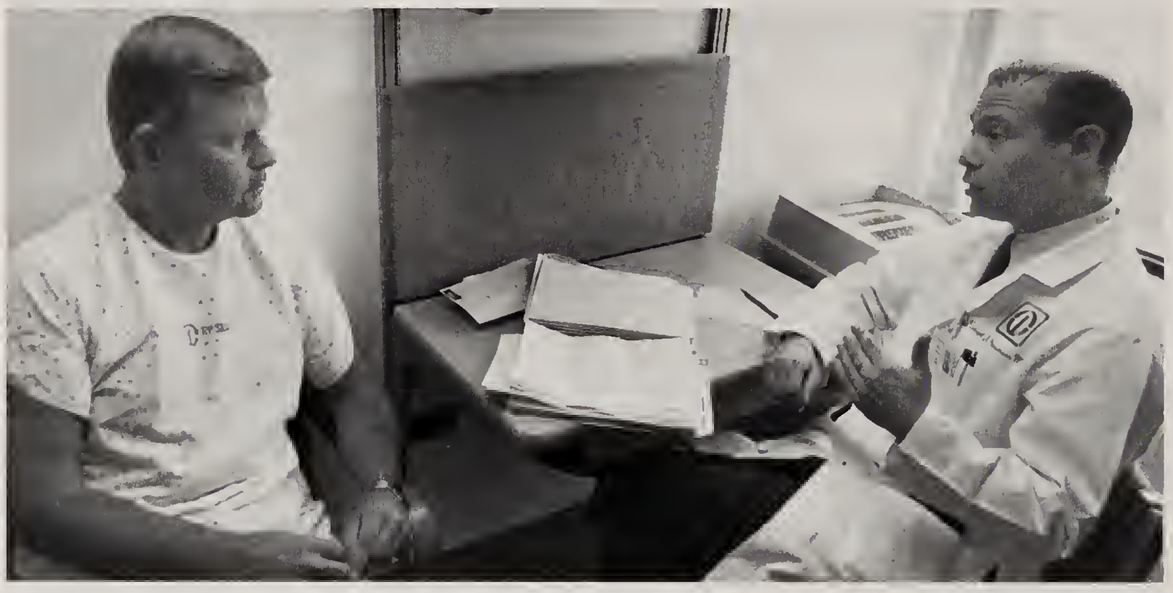
An ounce of prevention is worth a pound of cure, and no one believes and preaches that more strongly than the staff of the Preventive Cardiology Center at Rush.

The Center's main component is the preventive cardiology clinic which offers a multidisciplinary approach to handling heart health. Dr. Liebson and Robert Rosenson, M.D., co-directors of the preventive cardiology program, are the cardiologists on staff. Joining them are exercise physiologist Joanne Hafner, R.N., M.S., nutritionist Andrea Domas, R.D., and behaviorist Nancy Goranson.

"We handle patients with abnormalities of lipids (fats), high blood pressure, smoking—all with the purpose of modifying risks," says Dr. Liebson.

High cholesterol and a family history of heart trouble led Janet Miller to the clinic last October. Following a diet and exercise program prescribed by clinic staff, she lost 20 pounds by January—a strong start to lowering her cholesterol.

Another big benefit was Miller's husband's involvement in the program. "He had been previously diagnosed with high cholesterol and was just seeing what the clinic had to offer compared with his internist," says Dr. Rosenson, who directs the lipid laboratory. His regular trips to accompany Miller on her clinic visits soon turned into actual appointments for him to treat his cholesterol and blood pressure problems.



Robert Rosenson, M.D. (right), co-director of the Preventive Cardiology Center, with patient in the Center's lipid laboratory.

Now, Miller's son, with a total cholesterol count of 300, has shown an interest in getting evaluated through the clinic. (Experts suggest a desirable cholesterol count should be under 200.) "With our family history, it's foolish not to do something about it," Miller says.

The new preventive cardiology consult service is an offshoot of the clinic. Cardiologists see heart patients before they are discharged from the hospital to evaluate them, recommend a treatment strategy and refer them to the lipids clinic. "I like this opportunity to go into the hospital, at the bedside, when somebody's just had a heart attack and is more prone to be motivated," comments Dr. Rosenson.

Enrique Solis, a 61-year-old retired mechanic, first met Dr. Rosenson last year through the consult service after his second heart attack.

Solis began drinking and smoking at age 10. Forty years later, he quit both habits and became a vegetarian as well. Solis' diet was Dr. Rosenson's biggest concern.

"I'm afraid that I don't eat enough protein, so I eat a lot of cheese," Solis remembers telling Dr. Rosenson. "The high dairy diet was triggering weight gain and high cholesterol," Dr. Rosenson says. He put Solis on cholesterol-lowering medications and introduced him to the clinic's exercise physiologist and nutritionist.

Solis has gained and lost weight since his heart attack, and is still working to reduce his cholesterol. He praises the clinic staff for its personal attention. "This is a good clinic. Other doctors would probably give up with a person like me who goes up and down, but these guys have stayed with me," Solis says.

According to Dr. Rosenson, early contact, through the consult service, and early reinforcement are two keys to introducing patients to the clinic and to beginning treatment.

Support for Change

Directly associated with the clinic is the lipid laboratory. The lab evaluates a patient's cholesterol level, type of vessel obstruction, blood proteins and blood viscosity. This evaluation, along with basic information like a patient's weight, height, and body measurements, health history and dietary habits, help the clinic staff to design a plan that meets the patient's needs and works to treat the patient's lipid disorders.

"One has to realize that with a lipoprotein disorder, you're dealing with a metabolic disorder, like diabetes," explains Dr. Rosenson. "The patients have to undergo lifestyle changes, and one should not assume that that's easy; it is very difficult."

"We hope to help patients become more independent and to look at their own lives and make those changes that need to be made," says Dr. Liebson.

The Medical Center also sponsors a chapter of Mended Hearts, Inc., a cardiac support group for patients who have faced or are facing cardiac problems—heart attack, for example, or cardiothoracic surgery, valve surgery, bypass surgery or angioplasty—or have cardiac risk factors. Trained volunteers, many with personal experiences to share, speak with and comfort patients.

Businessman Steven Nadle undertook a heart-healthy lifestyle

Using a multidisciplinary approach, co-director Philip Liebson, M.D. (right), and his colleagues at the Preventive Cardiology Center work with patients to lower risk factors for heart disease.

some four years ago. He quit smoking, took up walking and started to control his salt intake. So having a heart attack surprised him, even though he had a history of high blood pressure.

At first, he delayed going to the hospital, thinking that he had indigestion. "Heart attacks don't go away with a burp," Nadle says.

After initial treatment in Michigan where the attack occurred, Nadle came back to Illinois where his physician at Rush referred him to Dr. Rosenson. After seven months of care, Nadle understands his continuing objective: "With the amount of heart damage done, the thing to do is to avoid a second attack... through a change in lifestyle."

"Having a heart attack realigns all the things you thought were important."

Where his exercise was once for fitness, now it is for rebuilding his heart. And where diet maintenance used to be "passive watching," according to Nadle, it has become "a preoccupation." His total cholesterol, which was around 260 at the time of the heart attack, has dropped to 151 with the help of diet and medication.

As Nadle is quick to point out, "Having a heart attack realigns all the things you thought were important." ⓡ

Read Two Articles and Call Me in the Morning

Rush faculty collaborate with *World Book* on Medical Encyclopedia

A major publishing achievement—1,072 pages of clearly written, illustrated, authoritative and helpful information on medical subjects ranging from "abdomen" to "zygotes"—with five substantial appendices on symptoms, health issues at each stage of life, nutrition, exercise, and growing older—is being offered to the public this spring as:

THE
WORLD BOOK
*****
RUSH-
PRESBYTERIAN-
ST. LUKE'S
MEDICAL
CENTER
*****
MEDICAL
ENCYCLOPEDIA
Your Guide to
Good Health

Just a moment, you say. Of course, we know about the *World Book Encyclopedia,* and many of us know about its companion *Medical Encyclopedia,* but how in the world did Rush get into the picture?

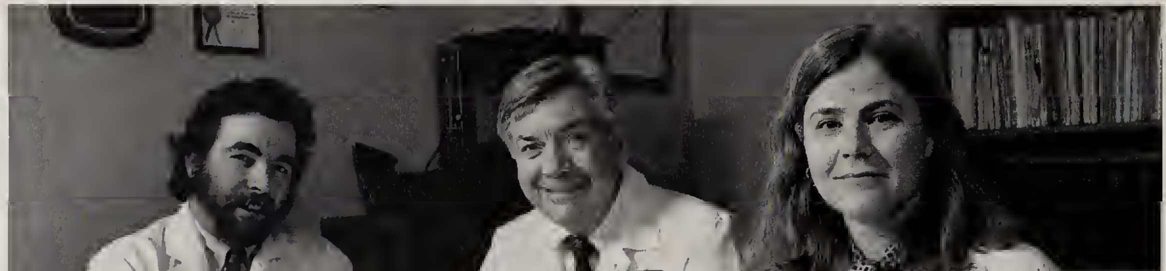
The answer is that for over a decade Rush faculty have served as advisors, consultants and editors for World Book's medical encyclopedia and today make up its entire board of medical consultants.

It began back in the late 1970s. At that time, World Book-Childcraft International, Inc. (as it was then known) was publisher of a four-volume illustrated *Home Medical Encyclopedia* which it made available to purchasers of the 22-volume *World Book Encyclopedia.* Serving on its national advisory board were Joseph R. Christian, M.D., then Woman's Board Professor and chairman of pediatrics at Rush, and Erich E. Brueschke, M.D., professor and chairman of family practice. Three other Rush faculty were among the special consultants.

"Dr. Christian was the senior Rush person in the early days and largely guided the direction we took," says Dr. Brueschke. The role of the advisors and consultants was to review each of the articles—major portions had been written in the United Kingdom and had to be adapted for an American audience—and to check each entry for accuracy, clarity and whether it represented the most up-to-date information. As new medical topics and interests arose, they were incorporated into the text.

Drs. Christian and Brueschke served on the five-member advisory board for the 1980 and 1984 editions. Luther Christman, Ph.D., R.N., then John L. and Helen Kellogg Dean of the Rush University College of Nursing; Stephen H. Sheldon, D.O., then coordinator of the pediatric residency program; and Gary Strokosch, M.D., director of the section of adolescent and young adult medicine, were three of the nine special consultants. With Dr. Christian's retirement in the early 1980s, Dr. Brueschke became medical editor of the planned 1988 edition. This was a major turning point in the development of the *Home Medical Encyclopedia.*

First, responding to the publish-



Medical encyclopedia editor Erich E. Brueschke, M.D. (center), with associate editors William A. Schwer, M.D., and Susan Vanderburg-Dent, M.D., family practice.

er's query on the subject, he argued that a comprehensive single volume would be highly preferable to the four-volume edition.

"Major points I made hinged on accessibility, quick reference, and simplifying the index, all of which were designed to help the user," Dr. Brueschke says. He also expanded the disciplines and departments represented among the medical editors and consultants.

Finally, he persuaded the publisher that all of the expertise needed could be found on the Rush campus and that tighter coordination and control would result from using Rush authorities exclusively. From a total of five Rush faculty members in the previous edition, the 1988 edition carried the names of 20 Rush people. This was the first "Rush" edition and an acknowledgement of Rush faculty was noted in the book itself.

Preliminary to the 1991 edition, an alphabetized 148-page double spaced list of every topic included in the previous edition was prepared. Dr. Brueschke sent a copy to each of the Rush editors and consultants, whose number had grown to 26, with directions to plug in appropriate relevant subjects in their respective fields that were *not* already covered. Their suggestions were discussed with the editorial staff of *World Book* to determine which should be included. Topics that made the cut were referred back to the appropriate Rush source to develop the entry. As in the past, Rush faculty were responsible for reviewing and updating every entry in their specialty areas.

Use of working faculty made sense from several angles. "These are men and women who are actively engaged every day in teaching," says Dr. Brueschke. "As a practitioner, you can be out of date fairly easily if you are not conscientious about staying abreast of what's happening in your field. Teachers have to stay on top of their subject or they'll be caught out very quickly.

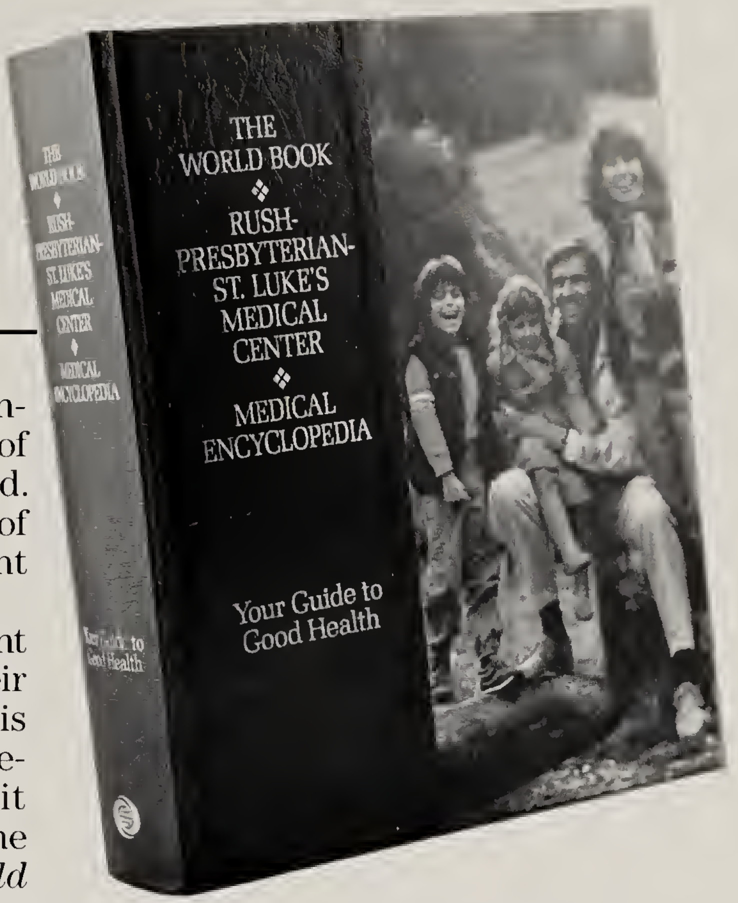
"Faculty also have a commitment to education, whether it's for their students or the general public. This comes across in the way they present their material to make it understandable. Of course, it's the final responsibility of the *World Book* editors to make sure the information is clear to the public, and they are very good at that."

Dr. Brueschke emphasizes that the medical encyclopedia is a way to make a contribution not just to scholarship but to preventive medicine.

"This is not a do-your-own diagnosis book," he says. "Our goal is to increase awareness by individuals of their own health, to make them partners with their doctors in looking after themselves. If a doctor tells them something, they can go to the book for a better understanding than they might get in a busy office. It used to be many years ago that physicians were reluctant to let a patient know too much, they feared there might be some sort of information overload causing needless anxiety. Today, the concept is that patients ought to be participants in their own treatment and the more they know, the better."

The best medicine, it is generally agreed, is preventive in nature. Dr. Brueschke is particularly pleased with the appendices, over 100 pages of them, which conclude the 1991 edition.

Two new appendices, one on "Health Maintenance: Nutrition and Exercise" (written by Susie Rockaway, Ph.D., clinical nutrition, and Keith Berndston, M.D., family practice), and another on "Growing Older" (by Steven K. Rothschild, M.D., family practice) were added.



"Just a careful reading of these two sections alone, and taking them to heart, could do a great deal to help people maintain their health," Dr. Brueschke says. "An informed public motivated to look after itself could eliminate approximately half the major health problems the nation has today."

The publishers and editors of *World Book* believe there is a substantial market for this latest version of their home medical encyclopedia. For the first time, they will be selling it through bookstores and other outlets nationally instead of limiting it to purchasers of the *World Book Encyclopedia.*

They also believe the efforts of the faculty at Rush-Presbyterian-St. Luke's are so integral to the finished product and provide validation of such high order to its contents that the name of the Medical Center should be integrated into the title as well. An agreement to do so was entered into in the fall of 1990 by the publisher and the Medical Center.

A first printing of 40,000 copies is already on the shelves and is being sold at $39.95 a copy. For many, it may be one of best investments they have ever made, an investment in their own health.

By Nancy Stetson

“You have cancer,” is still one of the most frightening sentences in the English language.

This year, 1,100,000 Americans will receive that diagnosis and a little less than half that number, 514,000 people, will die of cancer. At any given time, 10 million Americans are under active treatment for the disease. And the cost in terms of care and lost lifetime earnings is estimated to be in excess of $80 billion a year.

These statistics are sobering, yet they’re a marked improvement over earlier survival rates. A diagnosis of cancer is no longer an automatic death sentence.

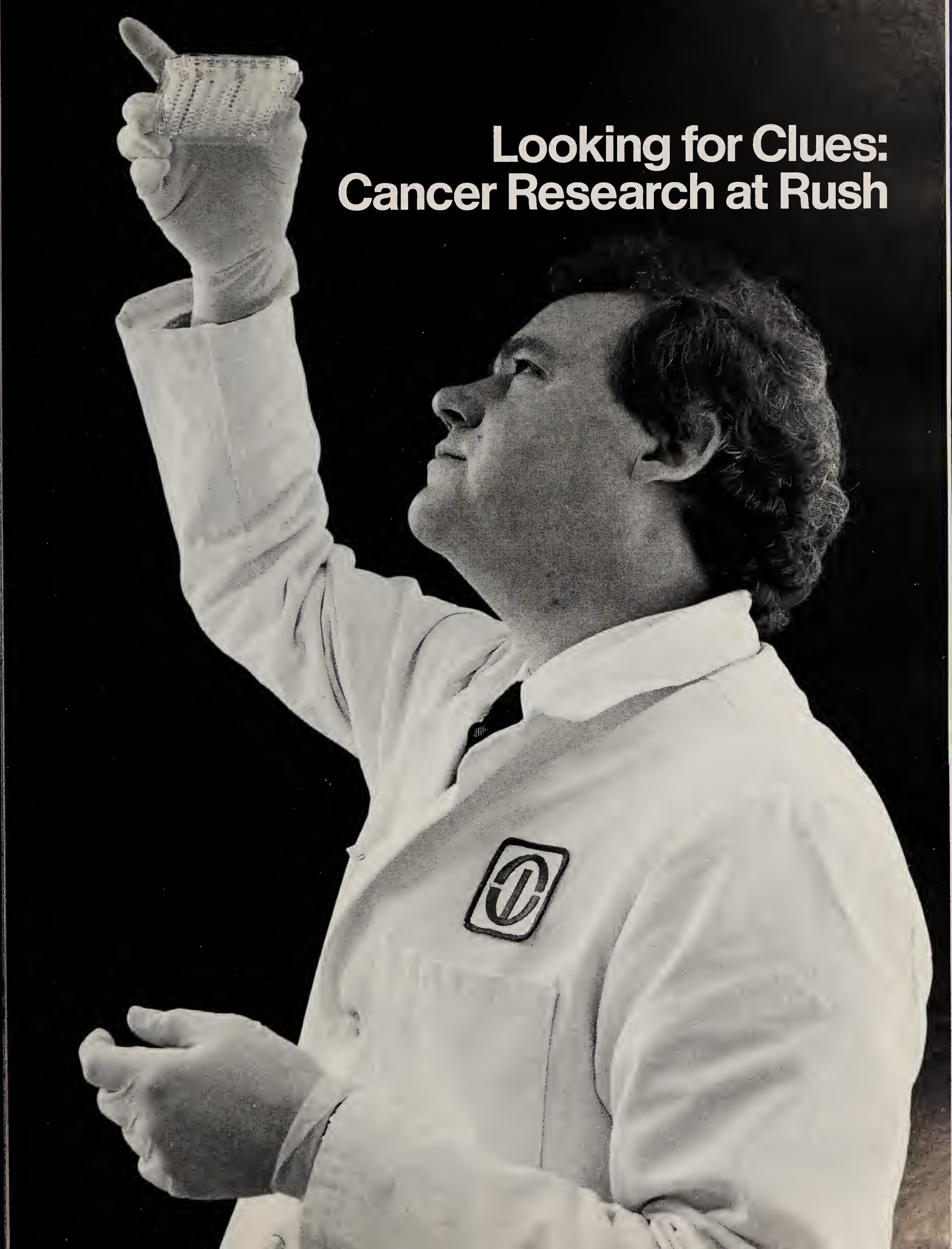
With our newer techology we can now detect cancer earlier and evaluate its extent and spread far better than ever before.

“Advances in cancer treatment come slowly, and that’s probably hard for the public to accept,” says Philip Bonomi, M.D., internal medicine, who specializes in lung cancer. “It’s a tough battle, but steady progress is being made. What we’ve learned about basic cancer cell biology over the past several years should lead to important advances in therapy over the next decade.”

Though many of the metaphors surrounding cancer have to do with battles or athletics, cancer researchers who work in the laboratory could more accurately be compared to criminal investigators. Through painstaking, slow, methodical work, they deal with small clues and pieces of evidence, attempting to discover what happened, how it happened, and what caused it.

Donald Braun, Ph.D., internal medicine, immunology/microbiology.

Looking for Clues: Cancer Research at Rush



How Cancer Invades Cells

Warren Knudson, Ph.D., biochemistry and pathology, in his lab.

Researchers at Rush-Presbyterian-St. Luke's Medical Center are studying what makes a cell become cancerous, how cancer invades tissue, and how to use the body's immune responses against malignant cells. Physicians in the examining rooms and operating rooms are also doing research, testing colon cancer vaccines, and attempting to improve survival rates for those with breast or lung cancer.

One of these investigators is Warren Knudson, Ph.D., assistant professor of biochemistry and pathology, who is studying tumor invasion.

"Cancer begins when cells within an organ go haywire," he explains. "Then the cancer starts to grow and, like a crab, it reaches out in all directions to surrounding tissue. I'm looking at some of the biological processes that occur when that happens, to try to determine how it happens, and what kind of things control the extent of that invasion."

Specifically, Dr. Knudson is studying the effects of cancer on extracellular matrix, which is the connective tissue between cells.

Scientists have discovered that when tumor cells come near normal cells, the normal cells self-destruct. The tumor cells produce proteins called enzymes that chew up the extracellular matrix, ultimately allowing them to easily invade surrounding tissue.

When the extracellular matrix is destroyed, new connective tissue is created. However, this new tissue has a higher concentration of hyaluronic acid. This increase in hyaluronic acid, which is a normal part of connective tissue, makes it easier for tumor cells to travel throughout the body. Because hyaluronic acid imbibes a great deal of water, it expands, deforming the matrix tissue even further. This may open up hydrated avenues for the tumor cells to travel along, almost like a boat through a channel.

Dr. Knudson's lab is working to discover where the hyaluronic acid comes from. Hyaluronic acid is generally in low concentrations in a normal adult and is only found in abundance in the embryo, during development. Tumor cells or normal cells, by themselves, only make small amounts of it. But when these two types of cells come near each other, a large amount of hyaluronic acid is created.

"We don't know exactly what the function of hyaluronic acid is," Dr. Knudson admits. "We don't know if eliminating hyaluronic acid would prevent tumor invasion. That's one of the things we'd like to test."

He points out that the spread of cancer is very similar to cell movement during fetal development. Just before embryonic cells move from one place to another, the space that they're going to move through becomes enriched with hyaluronic acid. As soon as the embryonic cells reach their destination, the hyaluronic acid is removed, and the

cells stop moving.

"We're studying the biology of what's occurring," he says. "We're looking for the protein on the tumor that's responsible for signaling normal cells to create hyaluronic acid. This may be a completely different signal than the one that tells normal cells to send out self-destructive enzymes. The tumor cell may send out several signals to instruct the surrounding tissue.

"So we've spent the last few years trying to isolate that protein. We've gone through several biochemical purification techniques to try to isolate it on the tumor cell surface. We've been able to narrow it down to 12 proteins, one of which is responsible for this activity."

But Dr. Knudson cautions that even if the protein is isolated in the laboratory and an antibody for it is developed, it may not mean they can halt cancer. "What works in the test tube doesn't always work in the human body, because it's a much more complicated environment. As soon as an antibody is introduced, the body would make other antibodies to fight it. Down the line, our findings will probably be best used in prognosis."

Tumor cells have receptors on their surface that allow them to interact with hyaluronic acid. Dr. Knudson's lab is also trying to develop ways to block these receptors so the tumor cells cannot invade tissue, essentially becoming deactivated.

"The point is, tumor cells do have the ability to communicate with other cells," says Dr. Knudson. "There are many things tumor cells can't do for themselves, so they'll get other cells to do it for them. This is a whole new way of looking at the invasion process of cancers, to focus on what the tumor cells do in communicating with other cells."

"There are many things tumor cells can't do for themselves, so they'll get other cells to do it for them."

Genes May Hold the Key to Tumor Growth

"Improved methods for detecting tumor metastases and measuring the response to therapy are essential," says molecular biologist Anand Iyer, Ph.D., assistant professor of internal medicine. "Sometimes tumors have spread so much that additional surgery is unsuitable, and radiotherapy is inadequate. The drug therapies in adequate doses to attack the cancer may be too toxic. All too often they produce positive results only for a short time.

"The key to solving these problems lies in the more intensive investigation of the differences which distinguish normal cells from malignant ones. We're now focusing our attention on genetic changes which occur during formation of human tumors."

One of the most important advances in understanding malignant disease occurred in the 1980s with the discovery of oncogenes—genes which have the ability to transform normal cells into malignant cells. Oncogenes are altered versions of normal human genes, called proto-genes, which ordinarily regulate growth and differentiation.

"Virtually all carcinogens—cancer-causing substances—are now thought to work by abnormally activating these proto-oncogenes, by altering their structure," says Dr. Iyer. "This causes them to become oncogenes.

"The carcinogens can also inactivate suppressor genes, which normally inhibit or slow down cell growth. This discovery has revolutionized science's study of how tumors evolve, grow, spread, and cause cancer in humans. We now believe that oncogenes/suppressor genes will be highly specific flags for detecting and diagnosing cancer, predicting the clinical direction and prognosis in a particular cancer, monitoring the effectiveness of cancer therapy, and early detecting of cancer recurrences.

"We need to develop the means to apply therapeutic interventions which will block the development of oncogenes and either limit or reverse their effects on tumor cells. This would effectively slow or prevent the growth and spread of cancer. The greatest promise of oncogene research is in what it will teach us about how oncogenes disturb normal cell growth."

Dr. Iyer compares these genes to the mechanism of a car. "The suppressor genes are like the brakes, and the oncogenes are the accelerator," he says. "When you get a mutation or an alteration that inactivates your brakes, that causes the accelerator to be out of control. This is what happens with most cancers—the suppressor genes are inactivated. Why do we get cancer? Why do we have unrestricted cell growth? That is what we are chasing after."

Dr. Iyer began working on this problem when he was with the National Cancer Institute (NCI) in Bethesda, Maryland, where he was part of a team that isolated and identified a new oncogene. The protein product of this oncogene is a growth factor receptor, which normally relays signals to grow from the cell's environment. When there are too many of these receptors on the cell surface, an abnormal state known as overexpression, the cells become capable of unregulated growth and tumor formation.

This finding is important, because in a variety of breast cancers, brain tumors, and stomach tumors, large quantities of similar oncogenes have been found. "So you could infer that a similar mechanism actually exists in these tumors," says Dr. Iyer.

"Our next step is to devise ways in the lab by which we can prevent these cells from proliferating uncontrollably and then maybe begin to use what we've learned for therapeutic purposes. So if a new gene is abnormally turned on, it may be possible in the future to target that specific gene therapeutically, perhaps using new pharmaceuticals or even gene therapy.

Molecular biologist Anand Iyer, Ph.D., (second from left) discusses his research with (l to r) Ashok Jagasia, Ph.D. student; Mark Johnson, M.D./Ph.D. student; and Kulvinder Kochhar, Ph.D.

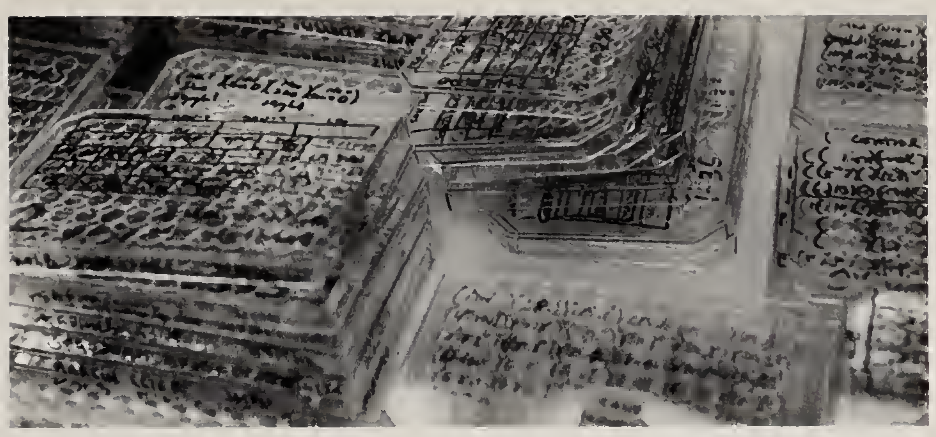
"We'd be suppressing the oncogenes, possibly by using the other suppressor genes. There might be other points within the cell, which, if shut off, keep the cell from dividing and then it would slowly die."

Dr. Iyer is also studying the cells of older people, because the way cells function during aging is the opposite of the way they function in cancer.

Every cell in our body goes through a finite number of replications. The aging process occurs because cells aren't able to divide and carry out their normal functions. "In aging, the proto-oncogenes are less active, and the suppressor genes are seemingly very active," he explains.

"In cancer, it's the opposite. We need to find a happy medium between the two to be able to regulate cell growth and control cancer. We're looking at why this process is shut down in the aging cell. Then we want to see if we can use that knowledge to control the growth of cancer cells.

"The research now being conducted in the field of molecular biology represents the most promising means of understanding this process and offers hope that this disease may one day be controllable."



How the Body Fights Cancer and Cancer Fights Back

Immunologist Donald Braun, Ph.D., associate professor of internal medicine and immunology/microbiology, is looking at the body's ability to mount immune responses against malignant cells.

"We now have the capability of taking immune cells out of a patient, growing them in tissue culture to large numbers, much greater than they would ever achieve in the body themselves," says Dr. Braun. "We can then return the cells into the body so the immunological potency against the tumor is increased manyfold."

But scientists have learned that although the body can make immunological responses against cancer, cancer has the capability of modifying the body's ability to make those responses.

"The body's immune response competes with the tumor's capability to subvert that response to protect itself," says Dr. Braun. "If the body wins, the tumor is destroyed. If the tumor wins, then not only is the tumor allowed to grow and progress, but the patient's immune system is also subverted and suppressed. We've been studying ways in which tumors suppress the immune system, because we feel that this is something that we might be able to manipulate."

Tumors protect themselves from the immune system in a number of ways. One way is to suppress the immune system by causing the body to produce large amounts of prostaglandins, which are products of the breakdown of membrane lipids and fatty acids. These products are increased in many inflammatory diseases, such as arthritis. In the presence of a tumor, prostaglandins work as a jamming mechanism, effectively shutting off immune reactions.

"We're attempting to find ways to overcome that reaction by testing the ability of compounds that can cut off prostaglandins, to allow immune reactions against the tumor to develop and be more effective," says Dr. Braun.

Another important project being conducted in our laboratories involves the use of biological response modifers, such as Interferon, to stimulate immune reactions against malignant cells.

"Interferon can participate in tumor-killing reactions," says Dr. Braun. "We now have to learn how to best administer it so that it will actually cause the cells at the tumor site to become activated."

Because the immune system's ability to kill tumor cells is limited, immunological therapy is offered as part of a total regimen along with chemotherapy and radiation. The number of tumor cells that can

Graduate student MiChung Ahn, M.S., in Dr. Braun's immunology/microbiology lab.

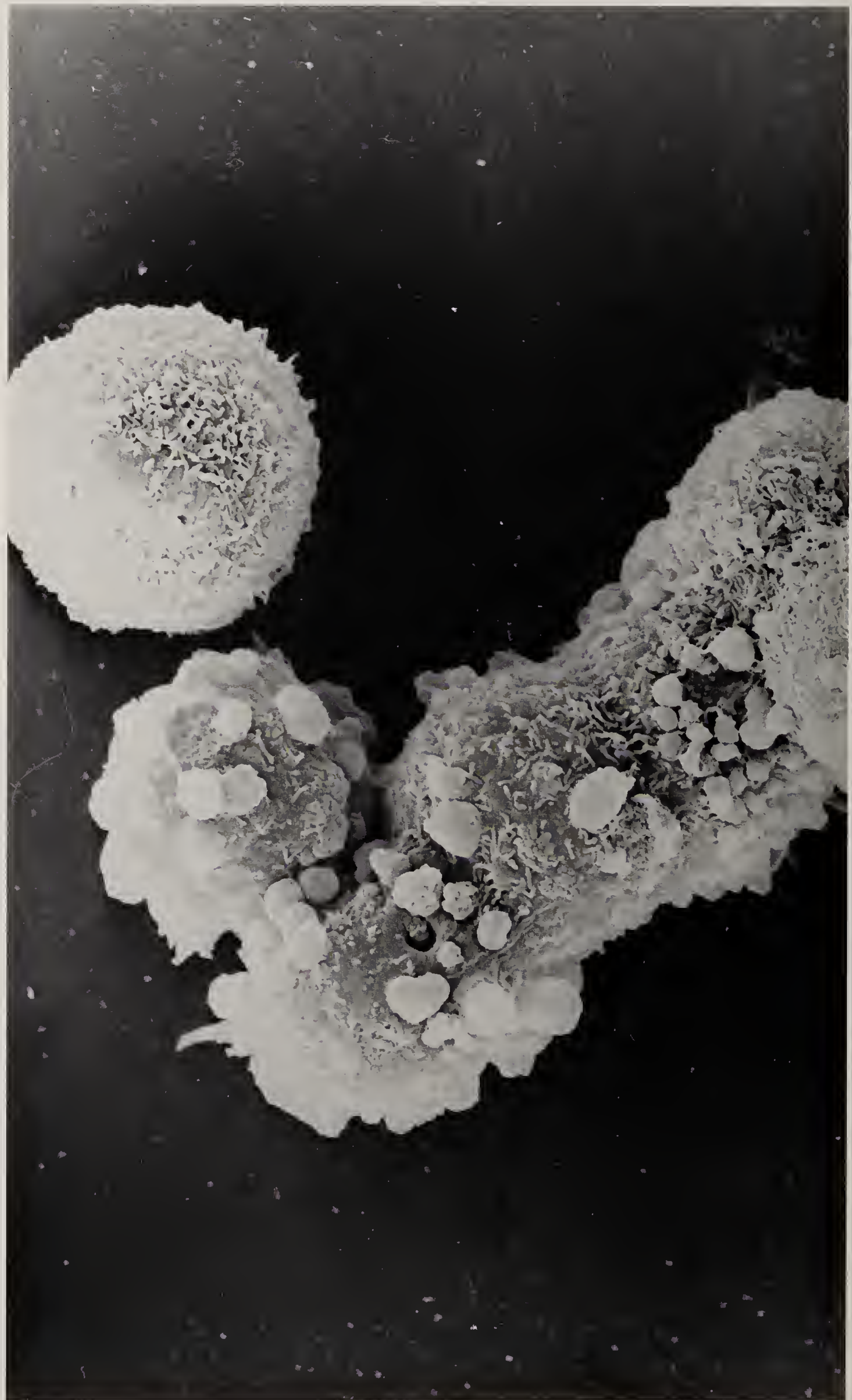
be killed by the immune system is lower than the number that can be killed by chemotherapy. The advantage of the immune approach is that it doesn't kill normal cells along with tumor cells, as chemotherapy and radiation therapy do.

Many tumor cells that are treated with chemotherapy escape destruction, because they have ways of protecting themselves. The tumor cells can become resistant to chemotherapy by developing proteins which pump out the cancer-fighting drugs.

"This is where the immune system plays a potentially critical role," says Dr. Braun. "Tumors which are resistant to chemotherapy can be killed by the immune system. This is a good rationale for using chemotherapy in combination with immune therapy."

Most of the success with immunological manipulation has been with tumors of the skin and kidneys. "We expect that other tumors will show sensitivity to immunological manipulation, if we can treat patients when they have very small tumors," he qualifies. "Much of the success of treatment depends not only on the tumor type, but the clinical stage of the disease when the immunological manipulation is performed.

"We still have a long way to go. Our knowledge about what causes cancer and how the immune system helps prevent it is growing rapidly. I believe that certainly by the end of this decade, we'll have an understanding that will be considerably greater than any of us dreamed possible just 10 years ago. I think we're going to make great strides."



Magnified view of cancer cells.

Combination Therapy Promising for Lung Cancer

Philip Bonomi, M.D., internal medicine.

L. Penfield Faber, M.D., cardiovascular-thoracic surgery.

Lung cancer remains the leading cause of cancer death in men in the United States. Over the past five years, it has also become the leading cause of cancer deaths in American women. It's estimated that in 1990, there were 160,000 new cases and 140,000 deaths due to lung cancer. Medical experts say that 75 percent of lung cancers can be directly attributed to smoking.

"The ratio of men to women who get lung cancer is now 2.5 to one," says L. Penfield Faber, M.D., professor of cardiovascular-thoracic surgery. "It used to be seven to one. This change is probably due to the increased incidence of smoking in the female population."

"Lung cancer is categorized by stages," Dr. Faber explains. "In order to estimate the prognosis of survival, you have to know the stage of the cancer. That's determined by the size and location of the tumor, and whether it involves the lymph nodes. Does it invade the heart, the chest wall, the lining of the chest wall? The smaller the size, the better the prognosis."

But receiving a diagnosis of lung cancer can be frightening, especially if it isn't caught in an early stage. The five-year survival rate for those with stage I cancer (the earliest phase) is 65 to 80 percent; for stage II, it is 40 to 45 percent; for stage III, it's 10 to 20 percent, and in some cases, even lower.

"We're trying to improve the survival rate for stage III, the clinically advanced tumors" Dr. Faber says. "And if we do a great job, we'll be able to double it to 20 to 40 percent."

Dr. Faber and Philip Bonomi, M.D., associate professor of internal medicine, have managed to do that for some of their patients with locally advanced, non-small-cell lung cancer by using an aggressive, multi-modality therapy that combines chemotherapy, radiation therapy and surgery.

In 1983, they saw evidence that chemotherapy seemed to be particularly successful in treating patients with stage III lung cancer. So they reasoned that administering chemo and radiation therapy together, before surgery, may have positive results.

"We have certain tools. They each have their limitations, drawbacks," says Dr. Bonomi. "The idea was to take the tools we have and try to use them better."

For seven years, a series of studies was done on 83 patients who were eligible for surgery. They went through a number of rigorous treatments, receiving chemotherapy and radiation therapy simultaneously.

"It was a regimen that in the past was felt to be too toxic, but by using different drugs and adjusting doses and schedules for both chemo and radiation therapy, we've developed a program with an acceptable level of toxicity," says Dr. Bonomi.

This multi-modality treatment provides the earliest chance to treat cancer that has spread. It also reduces the primary tumor or, in some cases, completely eliminates it. The Medical Center was among the first to test multi-modality

treatment prior to surgery in stage III lung cancer and involved more patients than similar studies at other institutions.

Drs. Faber and Bonomi were very encouraged by the results. Out of the 83 patients in the study, 62 went to surgery and in all but two patients, the tumor had responded to treatment, shrinking enough in size so that surgical removal was possible. This is roughly double what the rate would be if they were just treated by surgery alone. In 27 percent (17 patients), no evidence of the cancer could be found. The survival rate also nearly doubled to 22 months, as opposed to a 12-month expectancy rate with surgery only for patients with an advanced lung cancer.

"Their survival rate is 40 percent for four years, whereas before, with only surgery, they'd be in the 15 to 20 percent range," says Dr. Bonomi. "A followup of four years is significant in lung cancer because 98 percent of those who are going to have a recurrence of cancer will have one within two years. And when lung cancer recurs, it's basically incurable. So the fact that we're increasing the time of survival is encouraging."

He adds that they even have some seven-year survivors from the study. "It is possible for lung cancer to be cured," he says. "Absolutely. I think in any of those patients, even those who have survived for four years, I doubt whether the cancer's going to come back now. Those patients are probably cured."

New Treatments in Breast Cancer Delay Recurrence

Ever since former First Lady Betty Ford went public with her fight with breast cancer in 1973, women have been more aware of the possibility of getting breast cancer and of the importance of mammograms and monthly self-examinations to increase the chances of early detection and successful treatment.

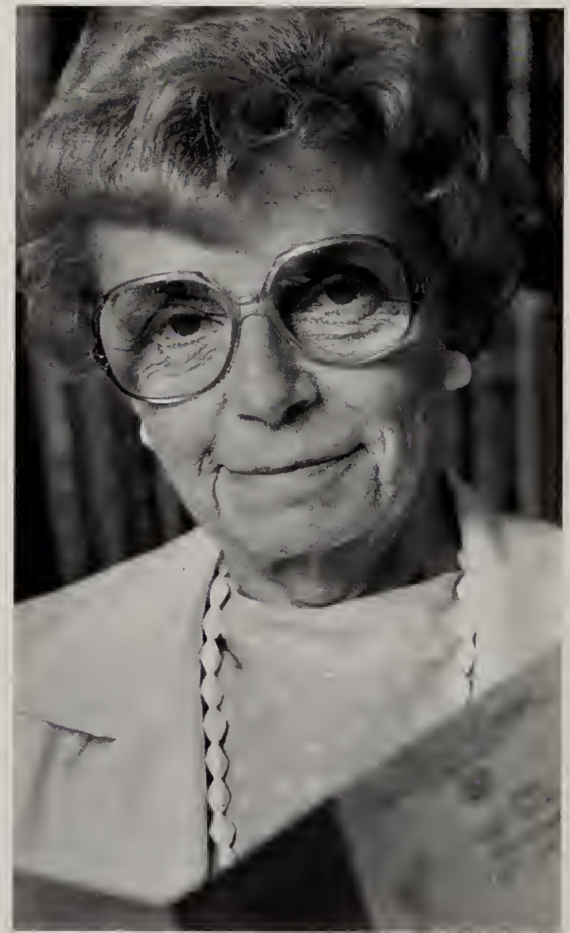
Last year, there were 150,000 new cases of breast cancer; 45,000 women died of it. This year, 175,000 cases are predicted. Breast cancer used to affect one in 10 women but in early 1991, the figure rose to one in nine.

"That's a rate that's truly hard to believe," says Janet Wolter, M.D., professor of internal medicine. "But we (physicians) agree we're seeing more breast cancer than we've ever seen before, particularly in younger women. We have no idea why."

At Rush, adjuvant treatment is a major focus of clinical research in breast cancer.

"Adjuvant roughly means 'going along with,'" Dr. Wolter explains. "It's using another form of treatment in addition to surgery. This could be hormones, radiation, chemotherapy, or a combination of them. Before we used adjuvant treatment, many women with breast cancer would have a recurrence within the first several years. Now, with adjuvant treatment, recurrences are often delayed for five or more years, and a significant percentage of women survive over those who receive no treatment. For the past 20 years the Medical Center has been actively involved with the National Surgical Adjuvant Breast Program (NSABP) and also participates in adjuvant studies of the Eastern Cooperative Oncology Group (ECOG).

"In the early days of our studies, we discovered that those who got chemotherapy did better than those who didn't. Hormone use in selected patients also proved advantageous. Women who are candidates for adjuvant treatment are those whose tumors have been



Janet Wolter, M.D., internal medicine.

completely removed, and in whom no physical or laboratory examination can detect any remaining cancer cells—we can't see them, feel them, or measure them."

It is impossible to tell in which women cancer will recur, so adjuvant treatment is recommended for all who are at high risk of recurrence. In the early '70s, only women with cancerous lymph nodes in the armpit were treated because statistics showed that 75 percent of them were at risk of recurrence. (If a woman has positive nodes, it means that tumor cells have traveled from the breast into the armpit. When a tumor shows this biologic capacity, it's also possible that these cells have spread to the rest of the body.)

However, 25 percent of women with negative nodes are also at risk for cancer recurrence, and adjuvant treatment is recommended for many of them as well.

"It is unfortunate that we have to treat many women unnecessarily because we don't know whose cancer will recur and whose won't," says Dr. Wolter. "We're trying to find some discriminant that will tell us who should be treated. So far, we haven't succeeded very well. There are a number of different factors that are now being looked at. Size is one key indicator. Tumors that are less than one centimeter in diameter, which is a little less than half an inch, usually don't need adjuvant treatment."

Most women with positive nodes benefit from chemotherapy. If a woman is post-menopausal and has positive nodes, she may benefit from hormone treatment with an anti-estrogen as well.

"We still have a number of questions. Can we improve the lot of negative node patients by combining chemotherapy and the hormone? Is there some way we can manipulate drug dosage to make it even more effective than what we've used in the past? And, if we treat the patient who has known breast cancer with chemotherapy before surgery, can we reduce the possibility of spread, as opposed to giving the treatment after the tumor is out?"

Barbara Mortimer, right, had a year of 24 chemotherapy treatments under a research study at Rush after surgery for breast cancer in 1988. She helps three-year-old son James dress for an outing with daughters Christine, 8, and Katharine, 10.

Rush is also involved with studies concerning women who have more than 10 positive nodes, which is considered a dire sign. It is estimated that close to 95 percent of these women will die of breast cancer unless they are treated, so they undergo strong chemotherapy regimens.

"We're trying to see if we can bring about the same benefit to these very high-risk people that we've brought to those not in that category," Dr. Wolter says.

In addition, the Section of Oncology, in conjunction with the Department of Psychology, is trying to replicate a study done in England which found that women with breast cancer who participated in a support group lived almost twice as long as those who didn't.

"Breast cancer is curable most of the time," Dr. Wolter says, "if it is detected and treated soon enough."

Vaccines Hold Hope for Colon Cancer Patients

In 1991, over 110,000 people will be diagnosed with colon cancer. About half of them will die from it, and anywhere from 20 to 70 percent, depending upon the stage of the disease at the time of diagnosis, will suffer a recurrence of the disease, following apparently successful surgical removal of their tumor.

Jules Harris, M.D., the Samuel G. Taylor III, M.D., Professor of Oncology and director of The Rush Cancer Center, heads a national collaborative study that is testing whether a cancer vaccine is effective in treating patients who have colon cancer in a moderately advanced stage, following surgery.

"The vaccine is prepared from the patient's own tumor cells, which have been carefully made into single-cell suspensions and radiated, so they won't pose a danger to the patient," Dr. Harris explains. "They're then mixed with a tuberculosis vaccine called BCG, and injected into the patient's skin, to stimulate anti-tumor immune function.

"It's expected that should there be any minimal residual disease of a microscopic nature, that the vaccine would cause the patient's immune system to respond and destroy that residual disease."

In a case when colon cancer is far advanced, the surgeon may be able to remove the tumor, but tumor cells may have already escaped to other parts of the body. In some cases, although surgeons remove everything they can see and feel of the tumor, it is still possible that microscopic cells remain at the primary site of origin, so the tumor can recur at that point.

In the study, which has been going on for four years now, patients are randomly assigned to observation or to receive the vaccine. The study is expected to continue for another two to three years, until there are between 500 and 600 patients in the study. At that point the rate of tumor recurrence and patient survival in both groups will be compared to see whether the vaccine is effective.

Dr. Harris stresses that the vaccine is not a generic one that could be used against all cancers. A special vaccine is created for each patient from the individual's own colon tumor.

"However, if this approach does work," Dr. Harris adds, "the same kind of approach might be attempted in other tumors, using cells taken specifically from the tumor. Vaccines for breast cancer, skin cancer, kidney cancer—all these things are possible, if we're able to show benefit with the colon cancer vaccine."

He admits that there is a possibility of eventually creating a generic cancer vaccine, but says "That's way down the line. We have a lot of clinical investigations to do before we're at that stage. But this is one step in the very painstaking approach to that possibility.

"Changes in lifestyle, preventive oncology, may make an even greater difference in the incidence of these diseases and survival, than changes in our therapy. But the vaccine program that we're studying now will affect all that, if we're able to see this thing through to a successful conclusion and derive lessons from this particular clinical investigation that we could apply to other tumor situations."

Jules Harris, M.D., director of The Rush Cancer Center, chats with a patient.

Medical students (from left) John Politsch, Mark Freher and George Katsamikos out for a run.

Medical students put 'healthy' into their lifestyles

By Justine Ringhofer

Do doctors who watch their diets, exercise, avoid risk factors for cardiovascular disease and deal effectively with stress better communicate the necessity of such practices to patients? Faculty at Rush Medical College feel that the answer to that question is 'Yes'—so they are adding course supplements to the curriculum which emphasize wellness and preventive medicine.

First-year students enrolled in the Alternative Curriculum (AC)—a two-year program in which students apply traditional medical school subjects in a small group study of individual case histories (*The Magazine*, Spring 1990)—learn about the concept of "wellness" as part of a new series of lectures in the Introduction to the Patient course. Through a health status screening and several discussions, these students identified their own risk factors for certain diseases, and are now adopting strategies that put "healthy" back in their lifestyles.

The idea for a course on wellness grew out of a realization that medical students are often the worst exemplars of good health habits.

"Medical students are too wrapped up in the process of becoming doctors," says Edward J. Eckenfels, assistant dean and associate professor of preventive medicine. "They eat junk food, they're under pressure, they don't sleep enough and they are exposed to drugs and alcohol.

"Our plan was to instill in first-year students the principles of health promotion and disease prevention, with the idea that if they maintain their own health and well-being, they will much more likely be sensitive to this in their own patients. And what better way to do that than to make themselves their own first patients?" says Eckenfels.

In designing the course, Eckenfels consulted with Robert Kassriel, M.D., associate professor, preventive medicine, because of Dr. Kassriel's 20 years experience promoting wellness at R.R. Donnelley & Sons Company. Dr. Kassriel arranged for free screenings by the Health Evaluation Program (HEP), through Lew Malter, HEP president, who sent a mobile unit, equipped with comprehensive health-monitoring technology, to test students and compile their health profiles without the usual fee. Students also completed questionnaires about their current health practices.

According to Dr. Kassriel, "Most doctors spend their 40s trying to regain the health they sacrificed as students in their 20s. Half of the students who participated in the screening had one or more problems indicated in their profiles, usually high cholesterol, vision problems or high blood pressure. For such young people, that's a fairly high rate. Reaching people early in life can help them prevent more serious risk factors later in life."

According to first-year medical student Christos Galanopoulos, "It was strange to come to medical school and be treated like a patient right away, but we really need to get this kind of information."

Classmate George Katsamikos agrees. "I found out that I had high cholesterol. Now, when my friends and I go to the cafeteria, I always look for the meal with the lowest cholesterol."

Three faculty physicians counsel students who want advice on how to improve their health.

Mark Freher, another AC student, joined a health club soon after the lectures in wellness began last September. "I was thinking about it before, but after hearing about the importance of diet and exercise... well, that was the push I needed."

During one class session, arranged by Dr. Kassriel, Eckenfels took students to a Loop-based fitness center, for a demonstration of exercise concepts and techniques.

"Two students went through a series of cardiofitness exercises," said Eckenfels. "Their heart rates and other vital signs were monitored to measure their health." In the class discussion afterwards, students talked about what they could do to maintain their own health and also brought up a number of concerns, including a discussion of how to be sensitive to patients in low-income situations and what exercise activities they could recommend to all patients.

"Most doctors spend their 40s trying to regain the health they sacrificed as students in their 20s."

Shortness of time was an area of student concern that surfaced when Eckenfels began a discussion about the stresses involved in medical school. "I didn't realize how much students needed to talk about this until I brought it up toward the end of one of our sessions," says Eckenfels. "In fact, I found out I could have devoted a whole class to that topic. So we'll devote more time to that topic the next time around. That's one benefit of this class. It's flexible and always evolving to incorporate subjects the students really want to talk about."

Eckenfels will follow up with his students by using the HEP mobile unit and rescreening them at different intervals, ideally every year until they graduate.

"I want to find out how important this type of curriculum was to them, if it made a difference in their

Assistant dean Edward J. Eckenfels counsels medical student Christos Galanapoulos about improving his health.

attitudes regarding their own health and their approach to the delivery of health care to the patient.

"I want to make sure that when they sit down with the patient, they develop a rapport of trust and empathy. I want them to tell patients that they realize how difficult it is to be health conscious and not to get discouraged. I want them to make suggestions like, 'You've got to get your husband off the cigarettes and you can take the salt shaker off the table.' I want them to engage the patient. That's an art. And that's the goal of this program."

Focus on Nutrition

By volunteering to give noontime lectures on nutrition, Eleanor Betz, R.D., a research nutritionist in preventive medicine, will answer students' questions about how they can maintain a healthy yet inexpensive diet.

Through a grant from the H.J. Heinz Company Foundation, James A. Schoenberger, M.D., the Charles J. and Margaret Roberts Professor and chairman of preventive medicine, is also working with a team of experts in nutrition and computer technology to design a computer-based course that will help students teach themselves about nutrition.

The course will cover topics such as obesity, diabetes, pregnancy and high blood pressure. "This is an effective way to give students a needed supplement to the curriculum, without taxing student or faculty time," Dr. Schoenberger explains.

"Students will be able to work on different modules, or chapters on nutrition as they choose," says Dr. Schoenberger. "They can stretch their learning over the entire four years, or finish the entire course in one semester."

The computer software for the course will be available, probably through the library resource center, on a continual basis. After they've completed a certain number of modules, students will have to take tests just as in any other required course.

Dr. Schoenberger estimates the installation of this project in 1994.

Helping Students Help Patients

Role playing is the method Philip R. Liebson, M.D., professor of medicine and co-director, preventive cardiology program, uses to teach his preventive cardiology workshops. Funded by a five-year Preventive Cardiology Academic Award he received from the National Heart, Lung and Blood Institute, these one-hour sessions are part of a curriculum which he has developed in the required course structure. These discussions focus on risk factors for cardiovascular disease.

In a workshop during the internal medicine clerkship, for example, an instructor acts as a patient with risk factors for coronary artery disease. Each student interviews this "patient" about health practices. At the end of the hour, the instructor tells the student what was done correctly, and what additional questions could and should have been asked.

Sessions in the behavioral science course go a bit further, to include not only the patient, but family members as well.

A fellow instructor, Tammy Sher, Ph.D., a behavioral scientist in psychology and social sciences, and Dr. Liebson take turns, one acting as the patient while the other takes the role of the husband or wife of that patient. Students practice talking to the "spouse" about the "patient," suggesting what part they can take in the loved one's care.

Students also have their blood pressure and cholesterol checked as part of a risk-factor profile in their first year.

"I think the average person pays attention to cholesterol more than the average physician, and we want the physician to pay at least as much attention," says Dr. Liebson.

"We tell students that in communicating with patients, they have to discuss risk, because risk has to do with the odds this person could get a disease. Before you can change the odds, you have to know what they are. You have to know the principles of epidemiology and biostatistics. These can be very dry subjects. But when students see how they apply to the individual patient, they become of vital interest."

The class of 1990 was the first to have preventive cardiology workshops incorporated into the curriculum under the preventive cardiology award program. Prior to graduation, the students were again evaluated for their health status. Dr. Liebson will analyze and compare the data to see if the health status of the class has significantly changed in those four years.

"Regardless of the teaching methods used," says Dr. Kassriel, "a common goal for students and patients is to increase their health awareness and knowledge, affect their attitudes and change their behavior so as to avoid the avoidable and prevent the preventable."

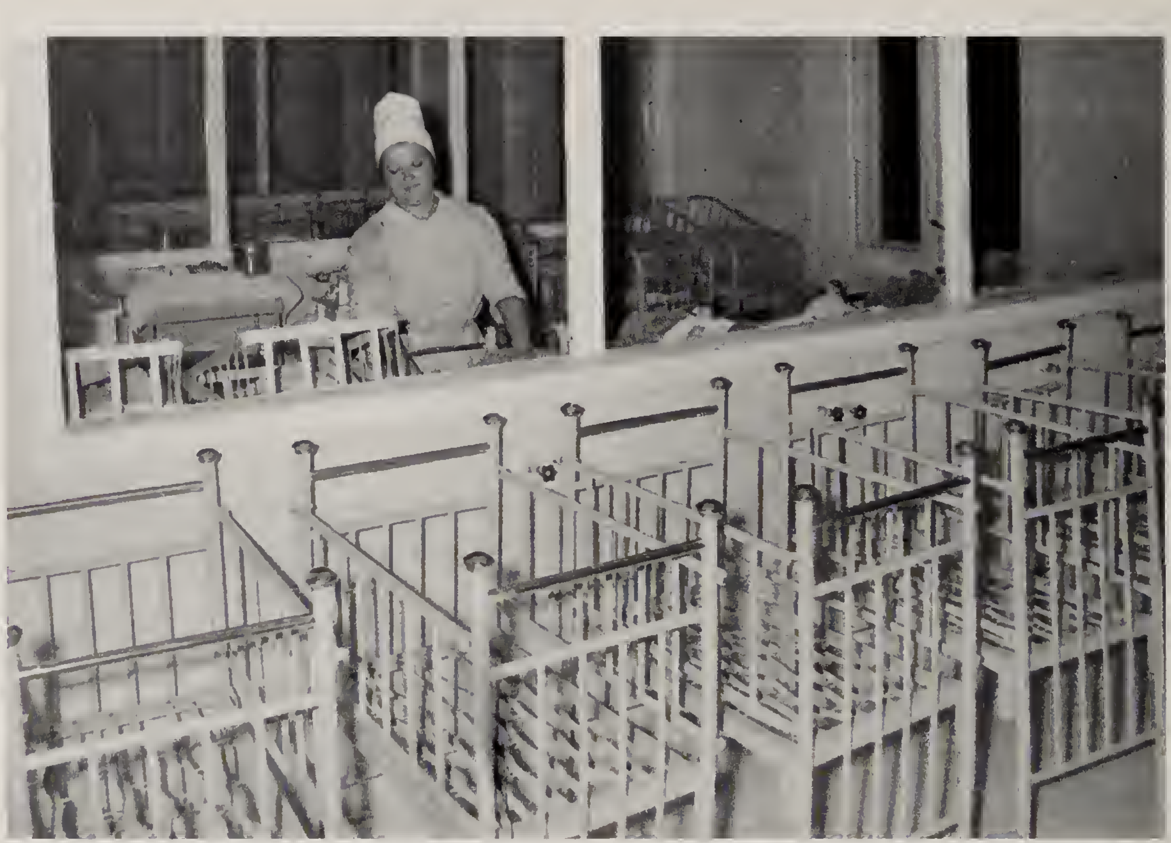
Back from the USSR

Late last year, three physicians and an administrator from the Department of Obstetrics and Gynecology grabbed the opportunity to visit the Soviet Union and view the healthcare systems there firsthand.

The group represented a cross-section of concerns: Vasil Truchly, M.D., is a senior attending in obstetrics and gynecology; Harold Bigger, M.D., is a neonatologist; Howard Strassner, M.D., is a maternal/fetal specialist dealing with high risk pregnancies; and Susan Kilburg, M.S., has a background in obstetrics/gynecology healthcare administration and a strong interest in infant mortality as a public health issue.

Dr. Truchly was program director of a congress of the World Federation of Ukrainian Medical Associations, held in Lviv and Kiev, near Chernobyl. "Just arranging the congress required that glasnost and perestroika be pushed as far as possible," he says. "Ukraine is on the verge of many changes and freedoms. The Ukrainian Minister of Health is trying to improve healthcare in the republic." In Ukrainian delivery rooms, it is common to have three or four women at a time give birth in the same room. Often, due to a lack of staff, these mothers are left on the tables for hours after delivering, their legs still in the stirrups, their babies on a table next to them.

Soviet Intensive Care nurseries are little more than rows of babies lying swaddled in open cribs. Special care equipment is scarce. In one hospital, the only assisted breathing technique being used was a plastic bag over the baby's head with a little tube of oxygen being piped into the bag.



A Soviet hospital's room for newborns. Soviet physicians traditionally wear "chef's hats."

Vasil Truchly, M.D., obstetrics and gynecology (far right) showing instruments to the Soviet physicians.

Dr. Truchly performed three hysterectomies in Ukraine. The anesthesiologist worked without a pulse oximeter, which measures the amount of oxygen in the blood, or electronic blood pressure monitor, using only a stethoscope and a blood pressure cuff.

"The conditions were just unbelievable, pitiful," says Dr. Truchly. "The nurse who assisted didn't have gloves. Then, during one operation, I ran out of suture and they gave me theirs to use. It was thick, like the string stores use to tie around your packages."

When Dr. Truchly presented stethoscopes and other instruments that had been donated by various companies, one Ukranian physician was so overwhelmed with the gift that she began to cry. Her stethoscope had been broken, and until then, she had no idea where she'd be able to get another.

Many of the hospitals Dr. Truchly and Kilburg visited are housed in buildings originally constructed for other purposes. Some of the rural hospitals don't even have hot water. The town of Lviv doesn't have water during the day, so hospitals there had to make special arrangements to have water.

After two weeks in Ukraine, Kilburg and Dr. Truchly met Drs. Bigger and Strassner in Moscow and then flew eight hours to the town of Ulan Ude in Siberia, five time zones away.

The team brought medical supplies and equipment, including a fetal monitor. At a press conference, they presented three quilts to hospitals there.

"We presented a quilt to the city," says Kilburg. "We told them that when we decorated our new Perinatal Center, we used quilts to make it very much like home—a soft, comforting environment. So we thought we would bring a little bit of home with us for them. They were very pleased, but nowhere near as excited as they were with the fetal monitor."

"Our experience in Siberia was very different from Ukraine," Dr. Truchly recalls. "When we were in Ulan Ude, we were guided to areas that they wanted us to see—the places that were clean, nice. But we didn't see any patients there. At a hospital that reportedly delivers 3,000 infants each year, there was only one patient. I listened to her fetal heartbeat, but she was the only one."

Adds Dr. Bigger, "We didn't see too many physicians or nurses in action." "We did tour their facilities, which probably meet the most basic requirements of medicine, at best. The equipment is generally outdated, much of it make-shift and improvised."

Dr. Strassner agrees. "In terms of medicine, it was striking how little they had to work with. It brought home the question of how well we would function if all we had to use were our eyes, ears, and our stethoscopes."

Since returning, the team has begun exploring the possibility of professional exchanges. Dr. Truchly has already received an invitation to return and work in a hospital for a month or longer. Kilburg is seeking funding to do research on infant mortality.

"It's a horrible situation," she concludes. "These people have very serious problems, healthcare being a major one. We all left feeling morally obligated to do whatever we can to help them." N.S.

Richard M. Morrow

Morrow Elected Board Of Trustees Chairman

Richard M. Morrow, former chairman and CEO of Amoco Corporation, has been elected chairman of the Medical Center's Board of Trustees.

Morrow succeeds Edgar D. Jannotta, who had served as chairman since 1988. A managing partner of William Blair and Company, Jannotta will continue as a Medical Center Trustee.

A Trustee since 1980, Morrow has served on the executive committee and has been a vice chairman of the Board since 1983.

Also a director of Westinghouse Electric and First Chicago Bank, Morrow is a Navy veteran and holds a degree from Ohio State University in mining and petroleum engineering.

Trustees recently elected as vice chairmen were John H. Bryan, chairman and CEO of Sara Lee Corporation, and Michael Simpson, chairman of the Board of A. M. Castle & Co.

Bryan is on the board of Amoco Corporation, First Chicago Corporation and the First National

Bank of Chicago, and the United Way of Chicago. He is vice-president of the Board of the Art Institute of Chicago, and an active member of the Chicago area Business Advisory Council, and the United Negro College Fund National Corporation's Committee.

Simpson has been active on the Medical Center's Executive, and Nominations and Trustee Planning Committees, and recently joined the Rush-Presbyterian-St. Luke's Health Plans, Inc., committee. He also serves as the Trustee Chairman of the Leadership Committee for Obstetrics and Gynecology.

Re-elected vice chairman was Marshall Field, chairman of the board of The Field Corporation and chairman of the executive committee of Cabot, Cabot & Forbes Company. Leo M. Henikoff, M.D., was re-elected president and CEO of the Medical Center.

Roger E. Anderson, former chairman of Continental Illinois Corporation and Continental Illinois National Bank and Trust Company of Chicago, stepped down from office after 12 years of service as vice chairman. He remains chairman of the Committee on Inter-institutional Affairs of the Board and a member of the Executive Committee.

Jack H. McEachern, Jr.

The Board also elected Jack H. McEachern, Jr., as an annual Trustee. McEachern is chairman of the Board of Copley Memorial Hospital and chairman of Fox Valley Health Services. He is president and part owner of Wayne Circuits, Inc., and a member of the board of directors of Yorkville National Bank. He also serves on the President's Advisory Council of Northern Illinois University and is a Trustee of The Illinois Mathematics and Science Academy.

In other action, the Trustees established the 48th endowed chair of Rush University. The Frances T. and Lester B. Knight Endowed Professorship of Gynecologic Oncology is dedicated to the memory of the founder of Lester B. Knight & Associates, Inc.—an international consulting and architectural firm—and his wife Frances, for their dedication and support of the Medical Center.

James T. Frankenbach and Patricia C. Skarulis have been elected vice presidents of the corporation.

Frankenbach is president of Rush North Shore Medical Center and has been associated with Rush for 15 years.

Skarulis, who heads up information services at the Medical Center, has served at Duke University, Princeton University, Bell Laboratories, Bowdoin College, and Rutgers University.

IVF Wishes 83 Babies Happy Birthday

The Inn at University Village was brimming over with babies—including several sets of twins and triplets—and joyous parents during the seventh annual birthday party sponsored by the In Vitro Fertilization (IVF) program in mid-March.

This year's party had a teddy bear theme. "We picked that theme —even the cake had a bear on top—because we can 'bearly' wait for the 100th IVF baby," said Susan Kilburg, M.S., administrative manager, obstetrics and gynecology. By party time 83 babies had been born through the program.

Each child received a stuffed teddy bear as a birthday gift. But the biggest attraction was a walking, talking, larger-than-life bear, (actually resident-in-bear's-clothing, Kian Behbekht, M.D.), that the children could hug, kiss or, in some cases, run away from.

Some babies, such as eight-week-old Melinda Dziabiroski, were able to ignore the noise and catch a few winks. Melinda was born through a new procedure called Tubal Embryo Transfer (TET), in which the egg cells are fertilized in the lab (in vitro), incubated for two days, then placed in the mother's fallopian tube.

Of the four assisted reproduction techniques—IVF, GIFT (Gamete Intrafallopian Transfer) ZIFT (Zygote Intrafallopian Transfer) and TET—the newest procedure, TET, promises to be the most successful, says Ewa Radwanska, M.D., Ph.D., director, Section of Reproductive Endocrinology.

This was certainly the case for Melinda's mother and father, Nudja and Azir Dziabiroski. "I consider

Six-year-old Gerry Doran helps Ewa Radwanska, M.D., Ph.D., director of reproductive endocrinology, and the IVF bear blow out the birthday candles.

Melinda a miracle baby," said Nudja.

Through assisted reproduction techniques, staff members help couples have children when the odds look bleak. Victoria Maclin, M.D., reproductive endocrinology, feels that developing a relationship with her patients has helped her pinpoint their needs. A case in point is Rose Ponce de Leon-Hale.

"I met Rose in 1985 when she was pregnant with her first child," says Dr. Maclin. "It took her seven years to achieve this natural pregnancy, and we both knew she'd have trouble carrying the baby to term. I helped her through preterm labor and finally, her daughter Jacqueline was born."

When she decided to have another child, Hale knew she had two choices, wait another seven years or more to conceive naturally, or go through the assisted reproduction methods Dr. Maclin told her about.

"Dr. Maclin had been so wonderful to me with my first pregnancy," said Hale, "that I knew she was the right one to help me achieve the second."

Hale's eventual pregnancy resulted from a combination of two procedures—GIFT and IVF.

The result? Twins.

"My theory is that one pregnancy came from GIFT, the other from IVF," says Dr. Maclin. "But it's hard to keep track with combination procedures. The important thing is that it worked. I'm very happy for Rose."

Katherine Rose and Christina Marie, the Hale's two new daughters, joined the other children as the candles on the birthday cake were blown out by five-year-old Gerry Doran, Rush's first IVF boy. The party is held on the birthday of the first IVF baby, Tiffany Autrey, who couldn't make the party this year. J.R.

Editor's note: At press time, the IVF program reported 90 births and 22 pregnancies, including two sets of twins.

$2.4 Million Grant Awarded to Rush For Alzheimer's Study

The National Institute on Aging (National Institutes of Health) has awarded a $2.4 million grant for Alzheimer's disease (AD) research to the Department of Neurological Sciences and the Rush Alzheimer's Disease Center (RADC).

The Program Project, "Anatomic, Physiologic and Cognitive Pathology of AD," will fund five research projects, headed by eight scientists based at Rush, the University of Chicago Pritzker School of Medicine, and Northwestern University Medical School.

Leyla deToledo-Morrell, Ph.D., professor of neurological sciences, is principal investigator of the overall project. A total of 19 scientists, physicians and technicians will work on the project either on the research or in the supporting cores.

The supporting cores provided by the five-year grant are based at Rush and include administrative, neuropathological, clinical and statistical components.

The specific research projects successful in securing the federal support are: 1) Electrophysiological Markers of Early Alzheimer's Disease, *Dr. deToledo-Morrell and Frank Morrell, M.D., project leaders;* 2) Knowledge Systems Analysis of Dementia in Early AD, *John D.E. Gabrieli, Ph.D., and Robert Wilson, Ph.D., project leaders;* 3) Hippocampal Synaptic Connectivity in AD, *Yuri Geinisman, M.D., Northwestern University Medical School, project leader;* 4) Nerve Growth Factor Trophism in AD, *Jeffrey Kordower, Ph.D., project leader;* and 5) Chemical Neuroanatomy of AD, *Clifford Saper, M.D., Ph.D., University of Chicago, project leader.*

"The understanding of the course of Alzheimer's disease as well as its potential treatment depend critically on the early recognition of the disease. Therefore, the development of non-invasive biological and behavioral markers of the earliest stages of AD is of great importance," said Dr. deToledo-Morrell. "Accordingly, the first two projects will examine the kinds of memory that are lost—and what's left intact—in early AD, and through non-invasive electrophysiologic testing, will try to determine what structures of the brain are involved.

"The three other projects are post-mortem studies: we'll look at the role nerve growth factors play, what impact impaired synaptic connectivity of certain brain regions has on memory loss, and what chemical markers exist that may track the course of development of AD." The post-mortem studies will rely heavily on tissue obtained through the Rush Brain Bank (see story on page 45), according to Dr. deToledo-Morrell.

"We're very pleased that the National Institute on Aging chose to support this research in Chicago," said Jacob H. Fox, M.D., co-principal investigator, and Jean Schweppe Armour Professor and Chairman of Neurological Sciences. "Dementia and aging has been my major interest since 1973. The findings in the pilot studies which led to these five projects are particularly exciting. We hope this work will lead to earlier diagnosis and more effective treatment."

Alzheimer's disease afflicts 4 million Americans and is the fourth leading cause of death among adults.

"When you consider how many families may be affected by Alzheimer's in the greater Chicago area, it's important that cutting edge research such as this be supported," Dr. Fox says.

The clinical core of the entire project is based at the RADC, which has been seeing patients since 1985. In 1987 the state designated it the regional resource center for AD patients and families in the Chicago area and northern Illinois.

Since it opened, the Center has served over 6,000 families through its clinical services, support services and educational programs. Over 1,500 patients have been diagnosed at the Center. The RADC Primary Provider Network now has 21 member hospitals, where families who suspect a member has Alzheimer's can go with that person for an initial comprehensive screening and diagnosis.

The RADC also provides diagnostic services and follow-up care, runs a day care program on the city's northwest side (the Alzheimer's Family Care Center), offers a hospice program, and has numerous clinical studies underway to test new drug therapies.

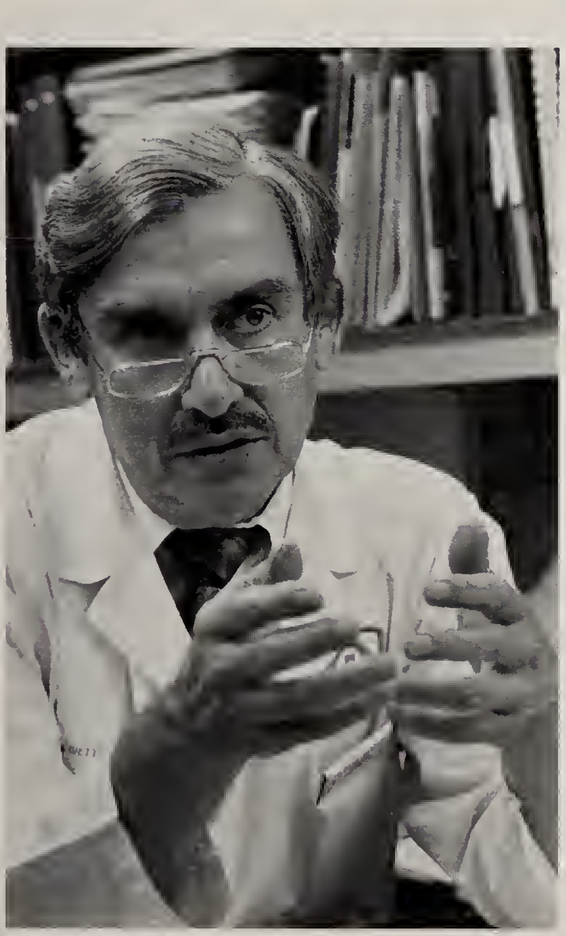
"There is no cure for Alzheimer's on the horizon," says Dr. Fox. "We are not sure what causes it. Through this research, we hope to improve our understanding of what happens during the course of the disease. This new knowledge should help us with better interventions in the future." C.R.

World Health Org. Proposes Rush As Collaborating Center

The World Health Organization (WHO) in Geneva, Switzerland, has proposed the Department of Biochemistry at the Medical Center be designated a Collaborating Center for the Field of Osteoarthritis (Rheumatology).

Klaus E. Kuettner, Ph.D., the John W. and Helen H. Watzek Professor and Chairman of the Department, would serve as Head of the Center.

"The Medical Center is honored to be chosen for this distinction," said Leo M. Henikoff, M.D., president and chief executive officer. "I'm sure that through Dr. Kuettner's dedication to research and education in the field of cartilage and osteoarthritis biochemistry, the World Health Organization will have a successful collaborating center."



Klaus E. Kuettner, Ph.D., chairman of biochemistry.

The designation would be for an initial period of four years. As a Collaborating Center, the department would assist WHO in setting up long-term epidemiological studies for the early detection of degenerative joint disease (especially osteoarthritis). The department would also help WHO develop and evaluate predictors for patients at risk for osteoarthritis.

The proposed WHO designation does not include any specific financial support. It represents, however, a recognition of Rush's commitment to actively participate in an international network of arthritis centers. There are numerous other arthritis collaborating centers worldwide which emphasize rheumatoid arthritis research. The Rush Center would be the first to focus on osteoarthritis.

About 50 million adults in the U.S. alone and close to 15 percent of the world population suffer from osteoarthritis. "Compared to inflammatory (rheumatoid) arthritis, research interest into osteoarthritis is still small with few active research centers," noted Dr. Kuettner. "Current treatments concentrate primarily on the late stages of the disease... we are looking at the very early stages of the disease."

In 1980, Dr. Kuettner began assembling an internationally respected team of scientists—known as the Connective Tissue Group—which has focused intensely on the etiopathology of the disease and, specifically, on how cartilage is involved in the early phases of the disease process. Rush biochemists have coined the term "chondrocytic chondrolysis" to describe what they believe goes on in early osteoarthritis: the self-destruction of cartilage by chondrocytes, the cartilage cells.

In 1987, these researchers received a $3.5 million, five-year SCOR (Specialized Center of Research) grant from the National Institutes of Health to support this work.

More recently, innovative studies at Rush on serum markers (to detect changes in cartilage metabolism) have shown it may be possible to detect biochemically very early osteoarthritis and thereby identify people at risk. As a WHO Collaborating Center, the department would continue its work in this area, survey patient populations using cartilage markers to try to subclassify the disease, share information with other Centers around the world by organizing international lectures and seminars, and, most of all, train young as well as experienced investigators in the areas of cartilage/osteoarthritis research, with the aim of transferring this knowledge to other laboratories and to the practice of medicine in the field of rheumatology/orthopedic surgery.

"Our goal is to lead the scientific-clinical community to develop a treatment or cure for the disease," said Dr. Kuettner. "As a short-term solution, halting the progression of the disease is the way to go. But ultimately we'd like to treat osteoarthritis, by encouraging the cartilage to repair itself."

Final word on the proposed designation is expected from the WHO Regional Office for the Americas, Washington, D.C., by June 1991. C.R.

Studying Lifting and Lower Back Pain

Orthopedic researchers and biomechanical engineers at Rush are studying the human spine to better understand the mechanics involved in low back pain and injury.

"We are studying what lifting—a major cause of low back pain—actually does to the spine," explains Gunnar B. Andersson, M.D., Ph.D., professor and associate chairman, orthopedic surgery. The study is one of the first to analyze the spine and its surrounding tissues in a dynamic, three-dimensional setting.

According to Dr. Andersson, lower back injuries are the number one cause of workers' compensation claims in the U.S. One-half of all injuries incurred by workers who do heavy physical labor are caused by lifting.

"Not only do these injuries result in chronic pain, but the cost of resulting workers' compensation claims has been estimated at $30 to $50 billion a year."

Dr. Andersson's research is partially funded by a five-year, $250,000 grant from Bristol-Myers Squibb Company and its subsidiary, Zimmer.

In a specially equipped Lift Laboratory, healthy volunteers perform different lift functions.

"We have developed instruments which make it possible for us to study in a very detailed way how all the different body segments move during the act of lifting," says Dr. Andersson.

With infrared markers placed externally on the back, legs and arms (depending on the particular function) volunteers perform lifts 10 to 30 times in a set.

Gunnar B. Andersson, M.D., Ph.D., orthopedic surgery.

Movements are measured in relation to the load being lifted, mathematical models are devised, observations are made from the models, and a computer calculates the internal forces at work inside the body. Researchers look at the computer-generated pictures and "see" the complex interactions among the tissues that control the spine.

Previous research studies and guidelines for lifting from the National Institute of Occupational Safety and Health were based on experiments in which volunteers lifted objects and then set them down in the same plane.

But lifting does not happen in that kind of symmetrical way, Dr. Andersson says.

"Workers often lift something and then twist their bodies to set it down in a different plane. When the body twists, we see activity in different muscles and this puts an uneven stress on the spine; the forces on some areas of the spine increase."

The ongoing research and laboratory experiments have led Dr. Andersson to make some suggestions about lifting. His recommendations include:

- Lift close to the body.
- Keep the body upright.
- Do not twist.
- Lift slowly and smoothly; do not jerk.
- Use both hands to divide the burden.
- Control the amount of the load; use any devices needed to help complete the lift.
- Avoid lifting from the floor.
- Vary work patterns to avoid overworking muscles.
- Know the weight of an object so you can prepare yourself mentally before lifting it.
- Before you start lifting, do warm-up exercises.

Thus far in the current project, Dr. Andersson reports, 100 people have been studied.

"We hope to learn as much as possible about what determines high loads. We know, for example, that just bending over and picking up an object of any size from the floor may cause the same load on the spine as lifting a weight of 50 to 100 pounds close to the body."

"We're providing the basis for more education. Once we fully understand the basics of lifting and how it affects the spine, we can expand our educational efforts to advise the working population how to lift more appropriately and prevent injury." C.E.

Research Is Primary Focus of Rush Brain Bank

When she was 58 years old, Martha occasionally forgot where she put her car keys and had difficulty remembering dates and names. By the time of her death 10 years later, Martha couldn't make a cup of coffee without help, didn't know her own husband's name and was unable to recognize her children. Alzheimer's disease (AD), a progressive, incurable disorder, had relentlessly destroyed her mind and, ultimately, her life.

Today, research in Alzheimer's disease is a national priority; the 1990s have been officially declared the "Decade of the Brain" by Congress. Over 4 million Americans suffer from Alzheimer's, which affects up to 10 percent of the U.S. population over age 65.

Research is the primary focus of the Rush Brain Bank, one in a long list of programs established by the Rush Alzheimer's Disease Center (RADC) in its efforts aimed at diagnosing, treating and ultimately finding a cure for AD.

As a patient at the RADC, Martha had undergone a battery of tests, including a brain biopsy, which was conducted as part of an experimental drug trial that she and her family had volunteered to participate in. When Martha died, her family also gave the Rush Brain Bank permission to conduct a brain autopsy.

In studying brain tissue under the microscope, researchers look at types and distribution of neuritic (senile) plaques, which accumulate between brain cells in the cerebral cortex (gray matter) of AD patients, and neurofibrillary tangles, which are accumulations of an abnormal protein in the neurons.

Typically, the extent of Alzheimer's pathology—the neuritic plaques and neurofibrillary tangles—found at autopsy correlates with dementia severity. But that wasn't true in Martha's case, according to David A. Bennett, M.D., clinical director of the RADC and assistant professor of neurology.

"When comparing the brain at autopsy with the biopsy findings, we were surprised that there was *no* significant change in the pathology, despite the marked decline in mental status," Dr. Bennet explains.

"It could be that many theories about the progression of AD may have to be rethought," Dr. Bennet adds. "There are operational definitions, but there are a lot of gray areas, so research is vitally important. We need to see a larger number of patients clinically *and* pathologically to derive empirical criteria for Alzheimer's disease."

Establishing criteria for a definitive diagnosis of Alzheimer's is just one aspect of the research studies.

"Being able to look at the progression of AD from the time of biopsy to the time of autopsy may ultimately help us uncover a cure," says Elizabeth Cochran, M.D., director of the Brain Bank and assistant professor in the Departments of Pathology and Neurology. "The banked brain tissue from biopsy and autopsy allows us to examine the progression of the disease, and will help us come to a better understanding of the course, and, it is hoped, the cause of AD."

What exactly is a "brain bank?" It is a storage facility for human brain tissue and spinal fluid. Brain tissue is obtained at autopsy from normal control patients and from patients who have been diagnosed with one of a variety of neurologic disorders, including Alzheimer's disease, Parkinson's disease and Huntington's Chorea. Tissue is stored either fixed in formalin or frozen in a special −70 degree C freezer.

"It's imperative that brain tissue be processed very quickly—within two to four hours of death—to be of greatest benefit for molecular biology studies," Dr. Cochran stresses. She, Carrie Schlaffer, brain bank coordinator, and other brain bank staff are on-call 24 hours a day (312/942-4463) to expedite this important process.

Although there are several brain banks in the U.S., the Rush facility is unique because most of the 90-plus organs in its depository are from patients RADC staff had been treating clinically for years.

"Many brain banks simply don't have a clinical history on their procured organs. We currently have clinical histories on 68 RADC patients we had been treating," Dr. Bennett says.

As a result, the Rush Brain Bank supplies tissue to researchers not only at the Medical Center but across the country. Among studies currently under way, investigators are searching for biological markers of AD.

"We are searching for a way to halt the progression of the disease early on. We would also like to come up with a conclusive test, other than autopsy, for an unequivocal diagnosis of Alzheimer's," Dr. Bennett says. "This could have a major impact on finding new drugs and improving the patients' quality of life." B.H.

Chicago Association for Arthritis Research Established

Rush is the coordinating center for the Chicago Association for Arthritis Research (CAAR), a network of eight participating hospitals seeking better treatments for arthritis and other rheumatoid diseases.

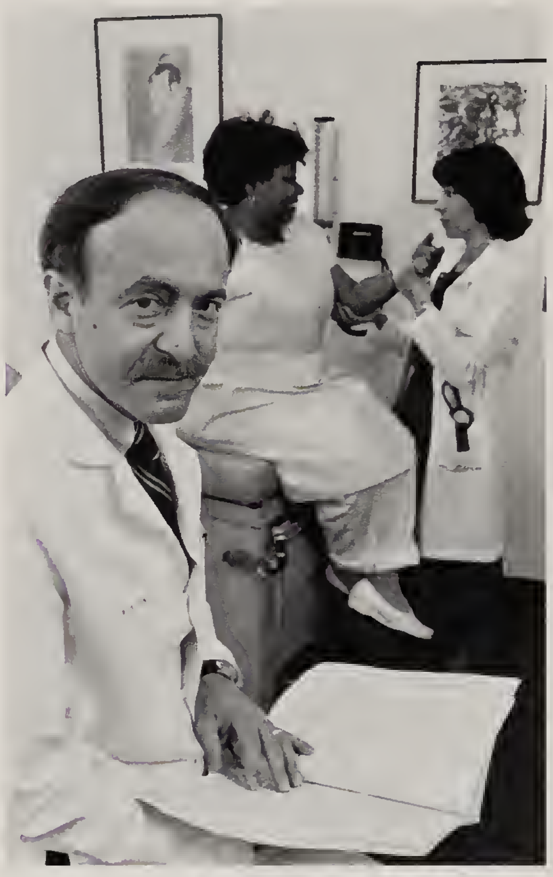
CAAR hospitals actively seek patients to participate in studies of new medical treatments. Studies underway or already completed since the association was organized last summer focus on osteoporosis, osteoarthritis, rheumatoid arthritis, lupus, and scleroderma.

"No one medical center in the Chicago area has a large enough patient base to cover the specifications needed by these types of studies," said Thomas J. Schnitzer, M.D., Ph.D., the Willard L. Wood, M.D., Professor of Rheumatology, and director of the sections of Rheumatology and of Geriatrics at Rush. "This network helps bring together the patient population needed to study new therapies."

Clinicians participating in the network meet quarterly at Rush to discuss current and upcoming studies.

Patients who participate receive free medical care as it relates to a study. This may include examinations, medications, bone scans, EKGs, and x-rays, depending on the study. Test results and other clinical information is returned to the patient's referring physician when a study is complete. At the participating centers, a team of arthritis specialists evaluates patients to determine their placement in a study.

"The program enables referring physicians to offer their patients something new in the way of treatment," said Dr. Schnitzer.



Thomas J. Schnitzer, M.D., Ph.D., director of rheumatology and geriatrics.

Patricia MacDonald, R.N., is clinical coordinator for the CAAR. She says about 400 patients have participated in CAAR studies thus far. "Many more times that number have been initially screened by our clinicians," she adds. "We usually have around nine studies going at one time."

Participating centers, in addition to Rush, include Cook County Hospital, Humana® Hospital—Michael Reese, and the University of Illinois Hospital, in Chicago; Lutheran General Hospital, Park Ridge; Rush North Shore Medical Center, Skokie; West Suburban Medical Center, Oak Park; and Olympia Fields Osteopathic Medical Center, Olympia Fields. C.R.

New Hope for Treating Schizophrenia

Mary, who is in her late 20s, talks to an imaginary friend, hallucinates frequently, is socially isolated and withdrawn, seldom bathes and cannot hold a steady job. Institutionalized several times over the past nine years, Mary cannot control her behavior or emotions; one moment she is content to watch television, the next moment she flies into a blind rage.

There are new therapies on the horizon to help Mary and the more than 2 million Americans with schizophrenia.

Rush is one of 20 institutions nationwide participating in a multicenter clinical trial to test the safety and efficacy of a new antipsychotic drug called remoxipride.

As a participant in the study, Mary has shown some improved periods of functioning.

"She is calm and not as overwhelmed by voices or suspicious thoughts. She is also tolerating the medicine very well," says her psychiatrist, Sushil Bagri, M.D., medical director, adult inpatient services, and assistant professor of psychiatry.

Primarily affecting people in their late teens and early 20s, schizophrenia is a slowly progressive psychotic disorder characterized by loss of contact with the environment and the gradual disintegration of thoughts, feelings and conduct.

For example, schizophrenics may hear voices berating them, or may walk around in circles mumbling unintelligibly. "Symptoms can occur in various combinations, making schizophrenia a complex disease with many faces," Dr. Bagri says.

The disease progresses slowly,

RUSHROUNDS

taking anywhere from several months to several years for its full downhill physical, emotional and intellectual slide to become apparent. "It appears that there's a trigger—a social, psychological stressor—which can bring on full blown schizophrenia," says Dr. Bagri.

Each year, another 100,000 new cases are diagnosed, making schizophrenia more common than muscular dystrophy, insulin-dependent diabetes or multiple sclerosis.

Under the direction of John Zajecka, M.D., clinical director of the Medical Center's Treatment Research Unit (TRU), Rush's remoxipride study got underway in June with inpatient and outpatient testing. Four hundred patients across the country will participate in the two-year study funded by Merck Sharpe & Dohme. (For information about participating, call 312/942-3532.)

Haloperidol is a standard treatment for schizophrenia, but side effects such as sedation, stiffness and Parkinson disease-like symptoms often interfere with the patient's willingness to take the medication," notes Dr. Zajecka.

"Furthermore, remoxipride appears to target the limbic area of the brain, which controls emotional functioning," says Dr. Zajecka. "Haloperidol and other conventional antipsychotic medications are far less specific."

Current thinking is that schizophrenia has more than one cause. Researchers suspect that one of them is an excess of the neurotransmitter dopamine in certain areas of the brain. Another hypothesis is that the disorder is the result of anatomical changes in the brain; scientists have discovered that the ventricles of schizophrenics are generally larger than those of the normal population.

Until recently, treatment for schizophrenia was lagging far behind other psychiatric illnesses, including depression, manic illness and anxiety disorders.

"With antidepressant drugs such as imipramine, amitriptyline and prozac, 85 percent of these patients are able to function normally in society," says Dr. Bagri.

"I am hopeful that remoxipride will slow the rate of deterioration so that our schizophrenic patients, too, will be able to function normally on a long-term basis." B.H.

Rush President and CEO Leo M. Henikoff, M.D. (right), was presented a charter by Sigma Xi President Frederick Shair, Ph.D., on April 16, as Rush was made an official chapter of the respected scientific research society. Sigma Xi includes 237 clubs and 281 chapters at institutions judged to exhibit a solid commitment to scientific research. Rush's election to chapter status followed an extensive review of the Medical Center's research facilities, in-house and national research support list, staff research publications and scientists' community involvement.

Henry P. Russe, M.D.
1928-1991

Henry P. Russe, M.D., recently appointed provost of Rush University and vice president, Rush-Presbyterian-St. Luke's Medical Center, died Friday, May 10, 1991, of an apparent heart attack. He was 63 years old.

"The sudden death of Dr. Russe brings great sadness to his many friends and colleagues. It is also a great loss to the medical and scientific community," said Leo M. Henikoff, M.D., president and chief executive officer at the Medical Center.

For 10 years, Dr. Russe had been vice president for medical affairs and dean of Rush Medical College. His career at Rush spanned 12 years. He joined the faculty and staff of the Medical Center in 1979, as assistant vice president for medical affairs and associate dean for medical sciences and services. He was named vice president and dean in 1981, becoming the twelfth head of Rush Medical College.

Dr. Russe held the faculty rank of professor of internal medicine.

"Henry Russe was a kind and compassionate physician and human being," said L. Penfield Faber, M.D., associate vice president and associate dean, surgical sciences and services. "He will be deeply missed by his colleagues and the medical students at Rush."

Prior to joining Rush, Dr. Russe was chief of staff and associate vice president for the medical center at the University of Chicago. He also spent a year as a scholar-in-residence at the Association of American Medical Colleges in Washington, D.C.

"Henry Russe excelled as a doctor, as an educator, and as a soldier," said long-time friend and colleague, George Block, M.D., deputy chairman of surgery at the University of Chicago Hospitals. "His death represents a tragedy and a great personal loss. It is also a loss for American medicine and education."

A native of Indianapolis, Indiana, Dr. Russe was a graduate of Indiana University and the University of Chicago Medical School and trained as an immunologist and allergist. He served with the U.S. Infantry during the Korean War and was decorated with the Combat Infantry Badge, the Bronze Star, and the Korean Service Medal with five battle stars.

Henry P. Russe, M.D.

Following the war he completed his training in internal medicine at the University of Chicago in 1961 and was on the staff there through 1968. He became chief of medicine at Columbus and Cuneo Hospitals in 1968 and was vice president of internal medicine from 1973 to 1976. In 1976 he assumed his positions at the University of Chicago.

An active member of many professional organizations, Dr. Russe served five terms as president of the Institute of Medicine of Chicago and seven years as chairman of its Board of Governors (1980-1986). He was also president of the Chicago Society of Internal Medicine, chairman of the Accreditation Council for Continuing Medical Education, a member of the original Chicago Health Systems Agency Review Board and a member of the American College of Surgeons Commission on Cancer.

Dr. Russe was a Fellow of the American College of Physicians, a member of Alpha Omega Alpha Medical Honor Society and Sigma Xi Science Honor Society, and was active on the Council of Deans of the Association of American Medical Colleges.

He received the Distinguished Service Award in 1984 from the University of Chicago Alumni Association, having served as president from 1975 to 1976. Since 1980, Dr. Russe had been a member of the Board of Overseers for the Illinois Institute of Technology.

Dr. Russe is survived by his wife, Pastora San Juan Cafferty, and four grown children, Paul, Catherine, Sarah J. and Thomas Russe, as well as two grandchildren, Megan Claire and Hannah Marie Russe. He is also survived by two sisters, Mary Anne Sipe and Nellie Knight.

Memorial gifts may be directed to The Henry P. Russe, M.D., Memorial Fund for Medical Education at Rush Medical College, 1700 West Van Buren, Room 250, Chicago, Illinois, 60612.

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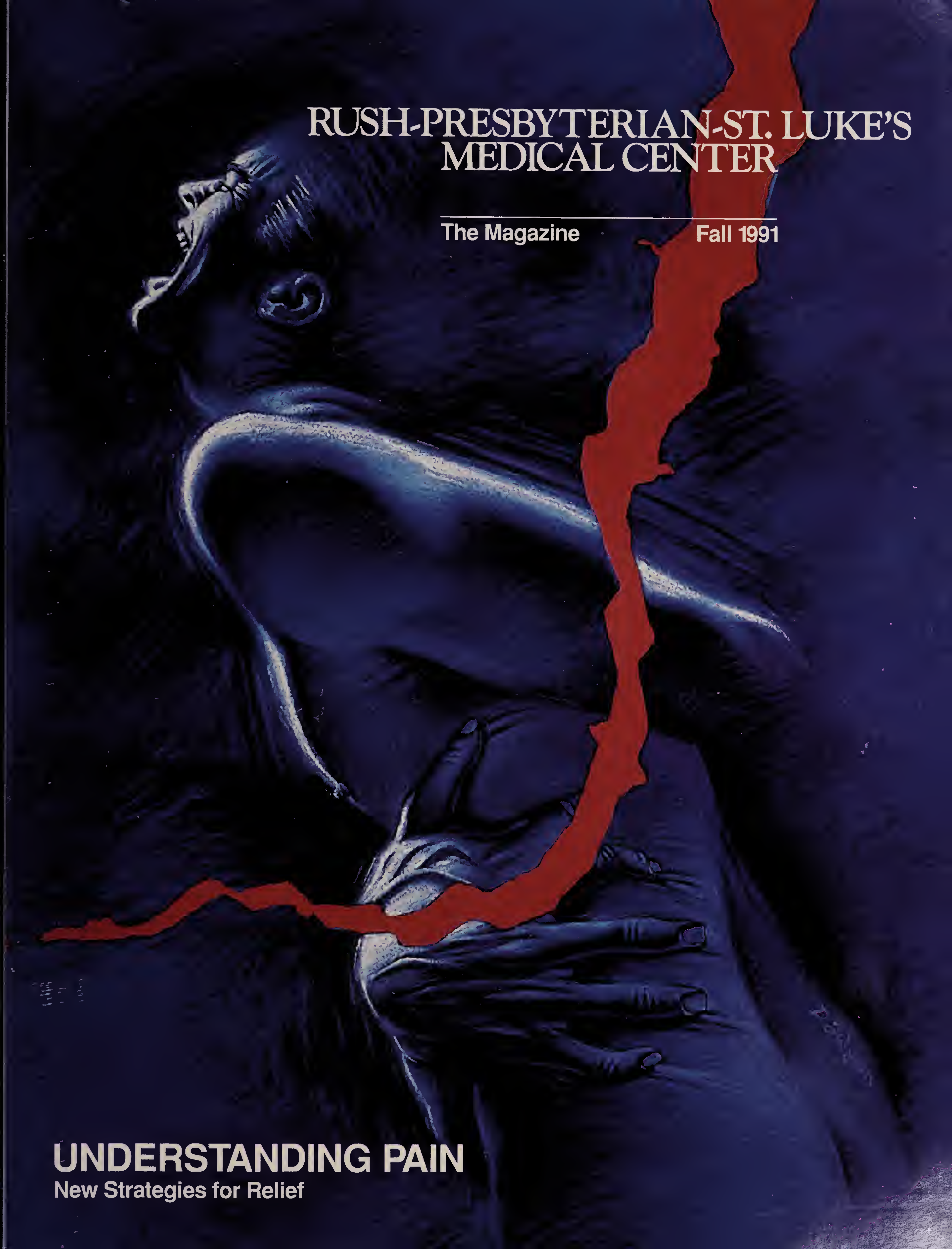

RUSH-PRESBYTERIAN-ST. LUKE'S MEDICAL CENTER

The Magazine

Fall 1991

UNDERSTANDING PAIN

New Strategies for Relief

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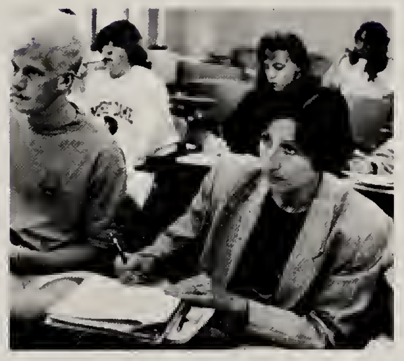

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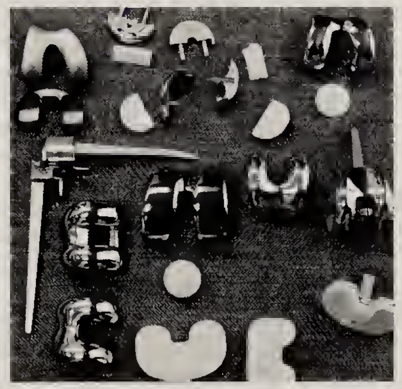


22

Pain 2

Everyone has experienced it and, for some, pain is a way of life. Today, medicine offers new strategies for relief.
by Marie Mahoney and Cheryl Janusz

When Your Child Is in Pain 12
by Marion Broome, Ph.D., R.N.

Changing Faces 16

Educational options at Rush attract a new breed of students to nursing.
by Barbara Harfmann

What Hospice Meant to My Family 20

The Alzheimer's Family Care Hospice is dedicated to helping patients and families during the terminal stage of the illness.
by Carol Keenan

A Concern for Dignity 21
by Justine Ringhofer

Moving Parts 22

With new designs and advances in surgery, knee replacement is becoming an option for younger, active patients.
by Sue Jeantheau

Why Does Cartilage Break Down? 28
by Carolyn Reed

Crossing Cultural Lines 31

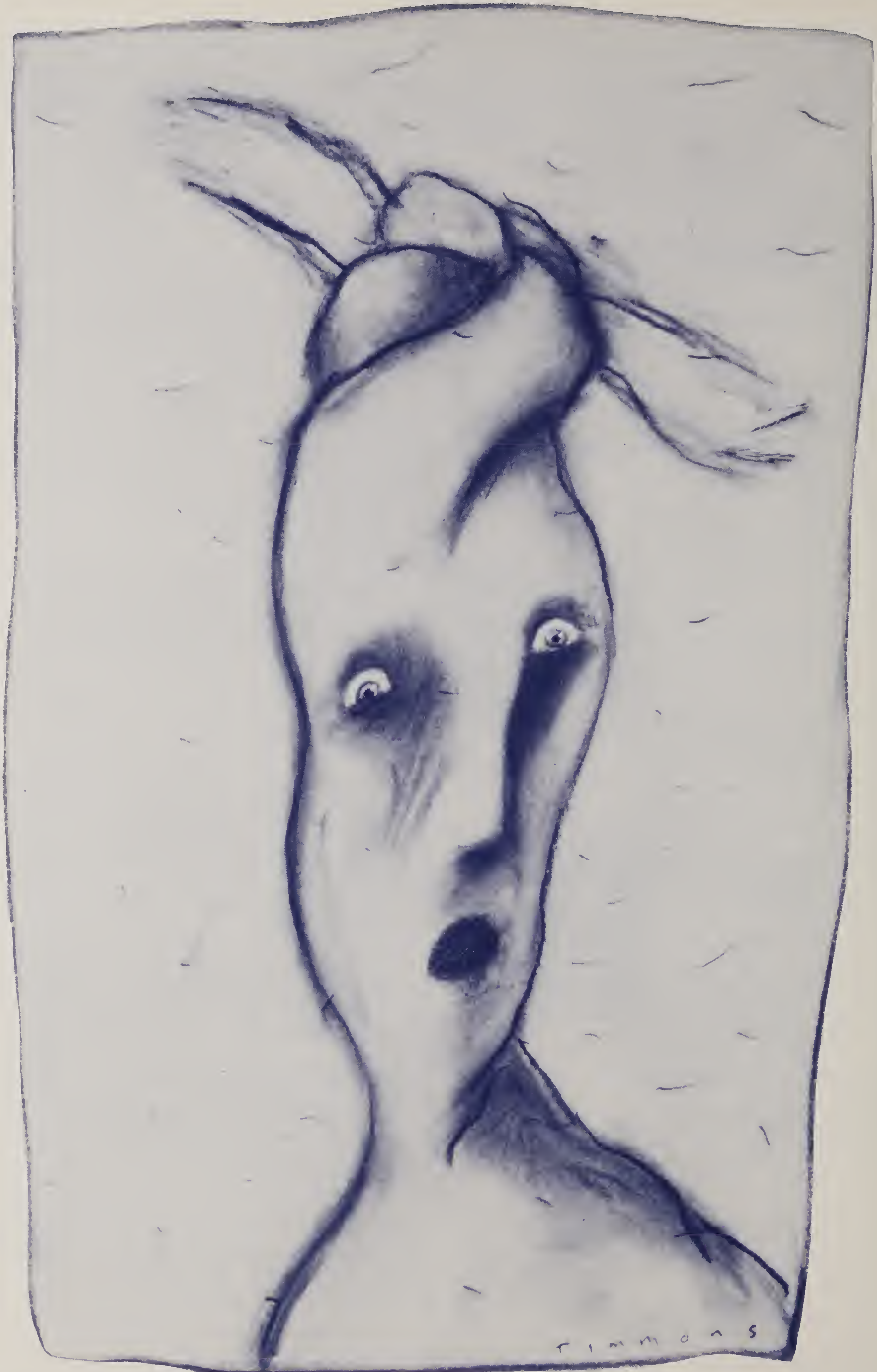
Understanding leads to better health care.
by Nancy Stetson

Answering a Call for Help 34

Rush pediatrician Richard Sandler, M.D., talks about his mission to assess the medical needs of Kurdish refugees.
by Carmeline Esposito

RushRounds 37

Activities and events at the Medical Center.


TIMMONS

PAIN

by Marie Mahoney and Cheryl Janusz

Pain is a great leveler. Everyone has experienced it. Contradictory as it sounds, life without it would be untenable. Pain is the body's watchdog, alerting us to the presence of internal and external foes alike. It keeps us alive. But extreme pain can also make us wish we were dead.

For most of us, pain only fleetingly interrupts our daily lives. Consider the time good intentions prompted you to break an exercise fast with one long and intensive workout. You were hoping to turn into Arnold Schwarzenegger but the next day found you walking like George Burns. Or what about the

time you emerged from a three-hour business meeting that added about 500 pounds to the weight of your head?

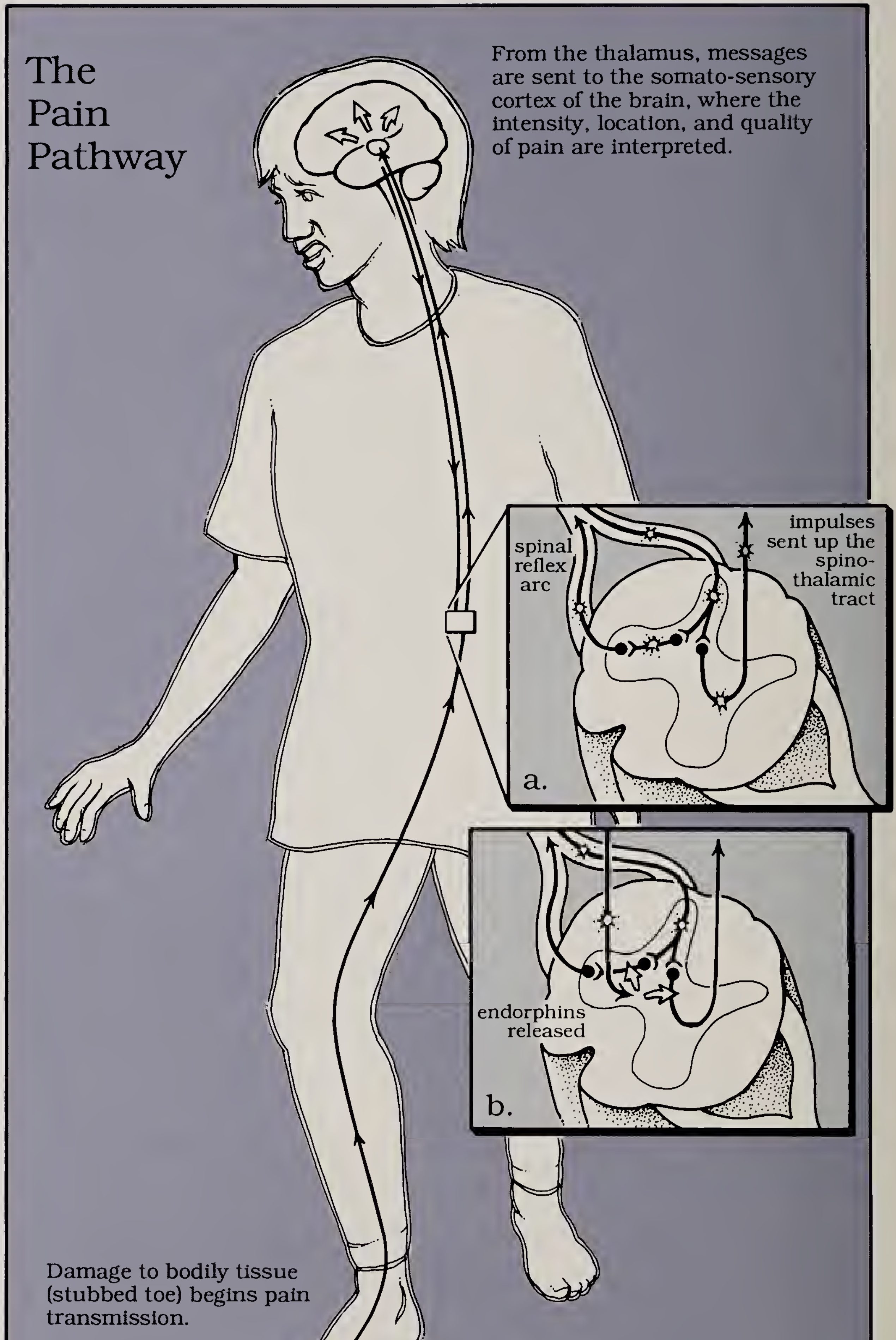
We can usually laugh a little at memories of pain. But for many people, pain is no laughing matter — it's a way of life. Millions begin each day with the crippling pain of arthritis. Their every move — bone rubbing against bone — is agony. Some endure blinding headaches every day. Countless others live with immobilizing back pain that transforms normal activities — like picking up a child — into Herculean tasks.

What Is Pain?

Constant or intermittent, pain is unmistakable when we feel it, and we rarely lack the vocabulary to describe it. Stabbing. Burning. Throbbing. Crushing. It seems simple: You stub your big toe against the foot of a couch. It hurts. Pain seems to be your body's unerring response to harm.

But that's just half the story. In fact, we are only able to recognize an experience as painful because of a complicated system of communication between body and mind.

In most cases, pain does begin with damage to bodily tissue. To illustrate, let's go back to that stubbed toe. Tissue damage is the result of the impact of your toe


The Pain Pathway

From the thalamus, messages are sent to the somato-sensory cortex of the brain, where the intensity, location, and quality of pain are interpreted.

Damage to bodily tissue (stubbed toe) begins pain transmission.

Feeling pain involves a complex communication between body and mind. Inset: Cross-section of spinal cord. a. Pain impulses entering the dorsal horn and splitting. One set of impulses goes to the thalamus, another set contributes to the spinal reflex. b. Messages sent down from the brain to the spine stimulate the release of natural painkillers in the dorsal horn.

against a hard and unyielding object. Tissue damage — either internal or external — can also be caused by disease, accidental injury, and medical interventions like surgery, which can be lifesaving in the long run but agonizing in the immediate aftermath.

It should be mentioned that your toe has to hit the couch with sufficient force for the experience to be painful. A stimulus that is pleasant — or at least tolerable — at one level, may be very painful at a higher level. A hot bath feels good; being burned by scalding water does not.

Damage to bodily tissue releases biochemicals that begin a sort of electrical reaction. These biochemicals act as "switches" to turn on pain receptors located on the ends of special nerve fibers responsive to pain. The nerve fibers then conduct the pain message from the site of injury — the peripheral nervous system — to their end point in the central nervous system, in an area of the spine known as the dorsal horn.

Within the dorsal horn, another electrical relay begins. Here, more biochemicals are released by the nerve fibers. They "recharge" the pain message by attaching to receptors on long nerve cells that span the length of the spinal cord.

These "spinothalamic tract fibers" carry the pain message to the thalamus. This is the area of the brain that receives and processes all sensory information except smell — that is, everything you taste, hear, see and touch.

There is a fast track to the thalamus, alongside a slower one. The fast track produces immediate, sharp and well-localized pain. The instant you stub your toe, there's no question of where it hurts. The slower pathway conveys information of a more burning, aching and diffuse pain that comes later but lasts longer. That's the pain that makes you sit down on the couch and gently massage your injured digit.

In any case, pain messages do not make an express trip from spine to brain. In fact, not all pain information reaches the thalamus.

On the way up it is subject to several modulating influences. Before your brain has registered the feeling of pain, information about the injury has been sent to other areas of the nervous system, where it is interpreted.

One of these modulating influences is the "spinal reflex," which occurs when nerve messages are sent from the spine to muscles near the injury. This is what makes you jerk your hand away from a flame, for instance, or flinch when you get hit in the face with a basketball.

> ***"We know some people can walk on hot coals. There are no physiological studies to tell us how they do it."***

Another initial response to injury is increased activity in the sympathetic nervous system. "This is signaled, for example, by a rise in blood pressure, increased heart rate, rapid breathing and pupil dilation," says Anthony D. Ivankovich, M.D., the William Gottschalk, M.D., Professor and chairman of anesthesiology, and director of the Rush Pain Center.

Pain information is also modified in the peripheral nervous system. "Injury to tissue causes inflammation, which makes nerve cells respond more than they normally would," says Richard D. Penn, M.D., associate attending surgeon and professor, neurosurgery.

"For instance, when you have an incision for an operation, besides the activation of pain receptors from the incision itself, there is also a chronic inflammation during the healing process."

We don't identify these messages as physical pain until they've made their way up to the thalamus. But even as the thalamus registers the sensation of pain, "messages sent *down* to the spinal cord trigger the release of natural painkillers, like endorphins," says Dr. Ivankovich. "This increases our threshold for pain by reducing the number of injury signals that reach the thalamus."

The process has been likened to a negative feedback loop, which automatically limits the current in a circuit. You may think your stubbed toe — or broken leg, or burned hand, or upset stomach — couldn't possibly hurt more. But you would feel much worse if it weren't for this natural system of pain control.

From the thalamus, pain information is transmitted to areas of the brain that control attention, cognition and emotion.

For instance, messages are sent from the thalamus to an area of the brain called the somato-sensory cortex. This enables us to recognize the quality, intensity and location of pain. Research has also shown that pain stimulates activity in the limbic system, the part of the brain that regulates emotions like fear, rage and anxiety.

But not much is known about the neurophysiology of pain at this level, according to Dr. Penn. "When you test people, everybody seems to have about the same neuromechanisms for perceiving pain. But their interpretation of pain can be widely different. We know that some people can walk on hot coals. There are no physiological studies to tell us how they do it."

Is It All in Your Head?

What does explain why some people can walk on coals while others can't stand to have their blood drawn?

We might start with sociocultural differences, says Laurel A. Burton, Th.D., the Bishop Anderson Professor and chairman of religion, health and human values. "Members of some ethnic groups are programmed by their backgrounds to approach pain with a stiff upper lip. There are other ethnic groups for whom complaining is a way of coping with pain."

Dr. Burton stresses that such cultural stereotypes are just rules of thumb. More important, every individual has different ways of dealing with pain. There are those who grit their teeth. Some deny the presence of pain. Others lament loudly, inviting us to share their distress.

"When someone tells me a person is overreacting to pain, I ask, 'In comparison to what?'" Dr. Burton says. "Often, if we say someone is overreacting or reacting badly, that's in comparison to our own norms."

Religion — or simply a spiritual belief system — can also help some people explain and endure pain. "A person might say, 'This pain is my cross to bear,' or 'God never gives us more than we can handle,'" says Dr. Burton. "These are adaptive ways of making sense of the pain. Some people even experience it as redemptive."

A person's ability to handle pain also has a lot to do with fears and expectations about the outcome of a

Anthony D. Ivankovich, M.D., the William Gottschalk, M.D., Professor and chairman of anesthesiology, and director of the Rush Pain Center.

painful experience, explains Judith A. Paice, M.S., R.N., clinical nurse specialist in neurosurgery and assistant professor, College of Nursing.

"I like to make the comparison between a woman suffering the pain of labor and delivery and another woman undergoing surgery for ovarian cancer," she says. "Physically, the intensity of their pain may be the same. But there are two different pictures if you consider the emotions ascribed to each experience."

Acute Versus Chronic

Most of the pain we suffer is acute. Acute pain is, with very rare exceptions, a direct result of injury or disease. It is short-lived, lasting during the course of an illness or as long as it takes for an injury to heal.

Acute pain can also be a "friend," alerting us that something has gone wrong within the body. "It often helps patients with acute pain to know that pain is a protective mechanism," says Robert Barkin, Pharm.D., assistant professor of anesthesia, family medicine, orthopedic surgery and pharmacology, and clinical specialist of pharmacy.

"The friend-foe relationship isn't as clear" for a person experiencing what medical professionals call chronic pain, says Dr. Barkin. "With chronic pain patients, psychopathological symptoms — including depression, anxiety and insomnia — frequently emerge," he says.

Chronic pain is pain that overstays its visit. It persists for months, even years, after pain from a disease or injury would normally cease.

With chronic pain, the physiologic standards for measuring acute pain no longer apply. After constant exposure the body becomes acclimated to pain. But chronic pain can lead to worse — if more subtle — problems.

"It's analogous to the difference between stress on the first day of a new job to the stress five years later," says Timothy R. Lubenow, M.D., associate attending physician and assistant professor, anesthesiology.

"If you encounter a stressful experience when you start a job, it may cause your heart to race and your blood pressure to rise. Five years down the road, after you've been living with the stress every day, it doesn't make your heart race anymore. Although the outward manifestations are less marked, continued stress — like continued pain — can cause significant internal problems."

> ***"Pain altered the life I lived inside my head. When I was in pain, there was no place to go."***

But chronic pain is not just a continuance of physical pain, although that can be severe. "Chronic pain disrupts every sphere of a person's life," says David F. Cella, Ph.D., assistant professor, psychology and social sciences.

People with chronic pain may not go out as much, or may drastically cut back on leisure activities they once loved. Their ability to perform a job is often diminished. They may panic, worrying not only about loss of income but also loss of identity.

Tom, a newspaper columnist, suffered a constant, dull ache in his lower back after his car was hit by a driver who ran a stop sign. He puts it simply: "I'm a writer. Writers are paid to sit. And sitting was the most painful thing I could do."

His initial response to the pain was anger, inspiring him with the will to fight back. But this deteriorated into despair when the pain dragged on for more than six months. He felt trapped. "Pain altered the life I lived inside my head. When I was in pain, there was no place to go."

Tom's pain eventually subsided. But he finds that typical daily activities — like sitting for hours in front of a computer — are more likely to cause him discomfort now. "Pain drew a line through my life," he says. "It won't be the same again."

Recent data suggest that about one-third of the American public suffers with chronic pain. The yearly bill — taking into account hundreds of millions of lost work days, health care costs, the expenses of compensation and litigation — is estimated to be $60 to $100 billion.

A Medical Stepchild?

Despite the monetary and human costs of both chronic and acute pain, the study and treatment of pain is still "sort of a stepchild field of medicine," says Dr. Penn.

A good illustration of pain's second-class status is the short shrift that, until very recently, has been given the headache — probably the most common pain.

Headaches are virtually universal, and are estimated to strike up to 70 million people intensely and frequently enough to be labeled chronic illness. But too often, they are not taken seriously. And, experts say, traditional remedies — such as the proverbial two aspirin at regular intervals — are often inadequate and may even exacerbate headaches.

In hospitals, pain control takes a back seat to curing diseases and to ensuring that patients survive operations, explains Dr. Penn. "Pain is just not a topic one considers primarily, and maybe it shouldn't be, because our primary concern should be making people healthy."

But in the meantime, he says, many patients suffer needlessly. "Many doctors don't know how to treat pain, and nurses are often afraid to give enough medication. Yet much pain is avoidable simply by using medications that we've had for centuries. Part of the battle is teaching people that pain can be controlled and that you won't make patients addicts by giving them drugs," says Dr. Penn.

Chronic pain is often more difficult for the medical community to handle. "Physicians have been educated to look for problems," says Dr. Lubenow. "If you can't find a problem, you can't find a solution. In chronic pain patients you may not be able to find one specific problem or identify a discrete cause of pain." In these cases, pain itself becomes the illness rather than a symptom.

Today, the complexities of chronic pain are getting their due as multidisciplinary pain clinics are opening around the country. These clinics draw on experts from many fields to focus on the psychological as well as physical aspects of pain.

The battle against pain — both chronic and acute — is being waged on many other fronts as well. Hospitals are trying more efficient methods of administering pain medications. Health care professionals are developing better ways to assess patients' pain. Researchers are looking for new medications without the troubling side effects of many commonly used analgesics.

Why the growing concern about pain? Says Dr. Ivankovich, "People expect more today. They're better informed, more sophisticated. It's clear to me that people are not willing to suffer any more than is necessary." — *M.M.*

A Measure of Relief

Despite progress in other areas of medicine, pain management remains behind the times.

Studies show that up to 75 percent of hospitalized patients receiving pain medication after surgery remain in moderate to severe pain. It's reported that chronic pain is also undertreated.

But experts say there's reason to hope that pain mismanagement is finally on the mend. Now there are better drugs and new ways to administer them. There's more awareness about the pain-relieving benefits of acupuncture and mild electrical stimulation. We're seeing greater emphasis on counseling and relaxation exercises to soothe pain's psychological impact.

Puritanical ideas about pain being "good for the soul" are becoming obsolete, as hospitals — and an increasingly sophisticated patient population — are aggressively seeking relief.

Today's Medicine Cabinet

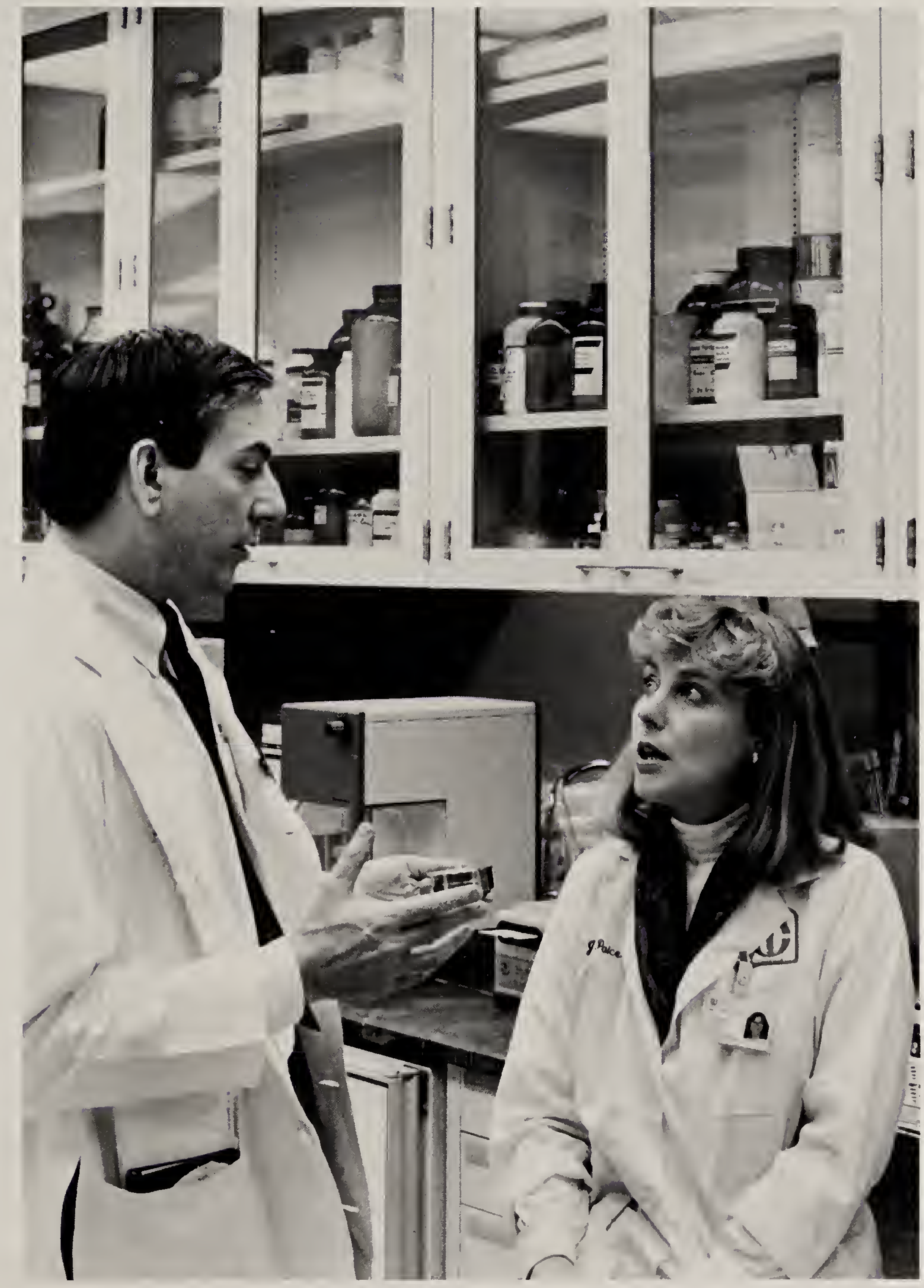
Specialists agree that most pain can be managed with oral medications and intramuscular or intravenous injections. Common painkillers include opiates, such as codeine and morphine, and new "opiate-like" drugs such as buprenorphine and dezocine. Nonsteroidal anti-inflammatory drugs (NSAIDS) such as aspirin and ibuprofen are also frequently prescribed.

Both opiates and NSAIDS prevent the pain "message" from reaching the brain, where the sensation of pain occurs. Opiates act in the central nervous system, halting the pain message at the spine. NSAIDS work in the peripheral nervous system, restricting the release of chemicals that trigger pain and inflammation.

Opiates and NSAIDS relieve pain without causing loss of consciousness. Unfortunately, both have side effects that can range from annoying to devastating. Taken orally, opiates may cause fatigue, nausea, constipation and, in rare cases, respiratory depression and addiction. NSAIDS irritate the digestive system, impair the blood's ability to clot, and can damage the kidneys.

Looking for alternatives, scientists are turning to nature. The body itself produces chemicals that modify pain response. Endorphins produced by the brain and spine, for example, induce what is commonly known as a "runner's high," which can mask painful muscle injuries. Across the country, researchers are investigating ways to stimulate the body's release of endorphins. At

Pain mismanagement is finally on the mend.



Richard D. Penn, M.D., and
Judith A. Paice, M.S., R.N.

Rush, scientists are investigating octreotide and tizanidine, synthetic forms of natural chemicals that have pain-modulating effects similar to those of endorphins.

Better Pain Control

As more medications become available, there's greater opportunity for relief. A patient who experiences excessive side effects with one drug may find a similar medication easier to tolerate. Physicians are also adding to patients' options by using novel ways to administer old as well as new drugs.

With patient-controlled analgesia, an electronic pump delivers pain medication through an intravenous line. "Patients can press a button and administer their own medication, with physician-established safety limits on the amount that's delivered," says Rush anesthesiologist Timothy R. Lubenow, M.D.

Another innovation, epidural analgesia, delivers morphine or other painkillers through a small catheter, inserted in the epidural space of the spinal column.

Medication that's injected or taken orally spreads throughout the body. This dissipates its effectiveness. "But the epidural catheter delivers medication where it's needed, to receptor areas at the spinal cord," explains Dr. Lubenow. "Administered correctly, a smaller dose can provide relief with few side effects."

In 1982, the Rush Pain Center was one of the first in the country to use epidural analgesia. "Studying the technique, we've seen evidence that hospitalized patients who receive epidural analgesia have fewer complications and a shorter convalescence," Dr. Lubenow says.

The Implantable Pump

For some patients, continuous drug delivery to the spine can treat chronic pain that's not soothed by other methods.

A case in point is 49-year-old Mike McAdamis. After eight months of chemotherapy and radiation treatment for Hodgkin's disease, he was pronounced cancer free, but one month later, he developed a rash that spread across his back and chest. Accompanying it was severe, stabbing pain.

"The pain was so intense I couldn't take a deep breath. It was worse than the cancer," McAdamis recalls.

His immune system weakened by cancer treatment, McAdamis had developed a viral infection called shingles. For most patients, shingles is temporary. Once the rash disappears, so does the pain. McAdamis, however, was left with nerve damage — a painful, incurable condition called post-herpetic neuralgia.

Oral pain medications left him

nauseated and "zombie-like," unable to function. Then he learned about the "pump," an implantable, programmable device which delivers painkiller directly to the spine.

Rush neurosurgeon Richard Penn, M.D., was instrumental in introducing a programmable pump and in 1982, was the first in the world to implant the pump to treat cancer pain. He performed the surgery on McAdamis in 1984.

The 10-ounce pump, roughly the size and shape of a hockey puck, is made of a space-age metal called titanium. The device includes a drug reservoir and a computer chip that can be programmed by the physician or nurse to deliver medication at the appropriate rate.

The pump is surgically implanted under the skin, in the fatty tissue of the abdominal wall. A slender tubing, the catheter, which extends from the pump's drug reservoir, is run under the skin to the spine. The pump is refilled by injecting medication through the skin directly into the filling port.

> ***"Thanks to the pump I can work, travel, enjoy my family and live a normal life."***

Compared to pills and injections, medication delivered by pump is less likely to enter the digestive system and brain — two sites where troubling side effects start. "The pump provides a regional effect at the spine," explains Dr. Penn. "We can give a thousandth of the dose and get 10 times the effect."

In most cases, the pump has been used in patients with cancer pain. Dr. Penn is now studying the pump's long-term benefits for patients with other chronic pain, including low back pain. The device is also being used in studies of morphine alternatives such as octreotide. Administered by pump, octreotide inhibits pain in a morphine-like fashion, but with fewer disabling side effects.

Mike McAdamis (right) relishes the freedom that accompanies the pain relief he gets with the implantable pump. Here, he shoots baskets with his teenage son, Matt.

The 10-ounce implantable pump is programmed to deliver pain medication.

One limitation on the pump's use is its cost — over $5,000 for the device alone. Also, surgery is required to implant the pump and that in itself involves some risk.

Still, for patients like McAdamis, the device provides relief that's priceless.

"The pump hasn't reduced my pain 100 percent, but it's now pain I can deal with," says McAdamis. "Thanks to the pump, I can work, travel, enjoy my family, and live a normal life."

Relief That Hits a Nerve

Other cases of chronic pain may respond to treatments that are less invasive than the pump. For localized pain, new variations on an older technique — nerve blocks — can be effective.

Most nerve blocks use chemical injections to temporarily numb the painful region. During this period of relief, chronic pain patients may engage in aggressive physical therapy, striving to break the cycle of pain and inactivity that can lead to muscle deterioration and disability.

Nerve blocks have proven particularly therapeutic for reflex sympathetic dystrophy (RSD), a devastating pain syndrome involving specific groups of nerves, usually in an arm or a leg.

Triggered by tissue damage such as a bone break or muscle tear, RSD is marked by constant burning pain, swelling, decreased range of motion and increased sensitivity to stimuli. Blood flow to the affected area may also be impaired.

For Joy Hyzny, 25, problems began three years ago with a ruptured tendon. Surgery to repair the tendon was successful, but her leg pain persisted long after the injury should have healed.

"The slightest touch — even the brush of a cotton ball — would be excruciating," recalls Hyzny.

Treated early, RSD is easier to control. Hyzny was diagnosed almost immediately by a physician who knew of the condition.

"Unfortunately, because its symptoms are vague and may include depression, RSD is sometimes misdiagnosed as a psychosomatic problem," explains Dr. Lubenow. Through the Rush Pain Center, Dr. Lubenow and his colleagues treat one of the largest RSD patient populations in the country.

RSD is chronic. Although symptoms may disappear for months, even years, they can recur. For Hyzny, nerve blocks and rigorous physical therapy help to control the pain.

Now, she's able to work and play. When RSD is in remission, Hyzny skis and enjoys other sports. "The feeling of being released from constant pain is indescribable," Hyzny says. "It's like being reborn."

A New Strategy

Novel delivery techniques and powerful new drugs provide more opportunities for relief. "But there's still no ideal recipe for pain management," says Rita Wickham, M.S., R.N., assistant professor, College of Nursing and practitioner-teacher, oncology unit.

Wickham deals with patient pain problems almost daily. "For infections, a certain dose of antibiotics usually works for everyone. But with pain, response to a 'standard dose' varies with each patient," she says.

Certain kinds of pain respond better to certain medications. For example, the deep, dull ache of cancer pain is often best soothed by an opiate. Also, counseling and relaxation techniques can enhance medication's effects, even on pain caused by tissue damage, such as a surgical incision.

Still, the key to optimal pain relief is frequent evaluation by physician, nurse, pharmacologist ... and patient.

"For a pharmacologic plan to work, the patient must be an integral part of the health care team as a player, not assuming the role of a victim. Patients must be given the opportunity to express their unique needs

When Your Child Is in Pain

by Marion E. Broome, Ph.D., R.N.

There is nothing as distressing to parents as watching their child experience pain — even when the pain is short-lived and "necessary," as with blood drawing or an immunization. And it's often this kind of common, acute pain experience that children fear the most.

Even four-year-olds (whose parents don't think they remember the last injection they received at 18 months of age) report they are afraid of needles and "shots." And, of course, surgery, recovery from a broken bone, or chronic diseases such as juvenile rheumatoid arthritis or sickle cell anemia all produce pain in varying amounts.

Yet research has consistently documented that children usually do not receive enough medication to relieve their pain and discomfort.

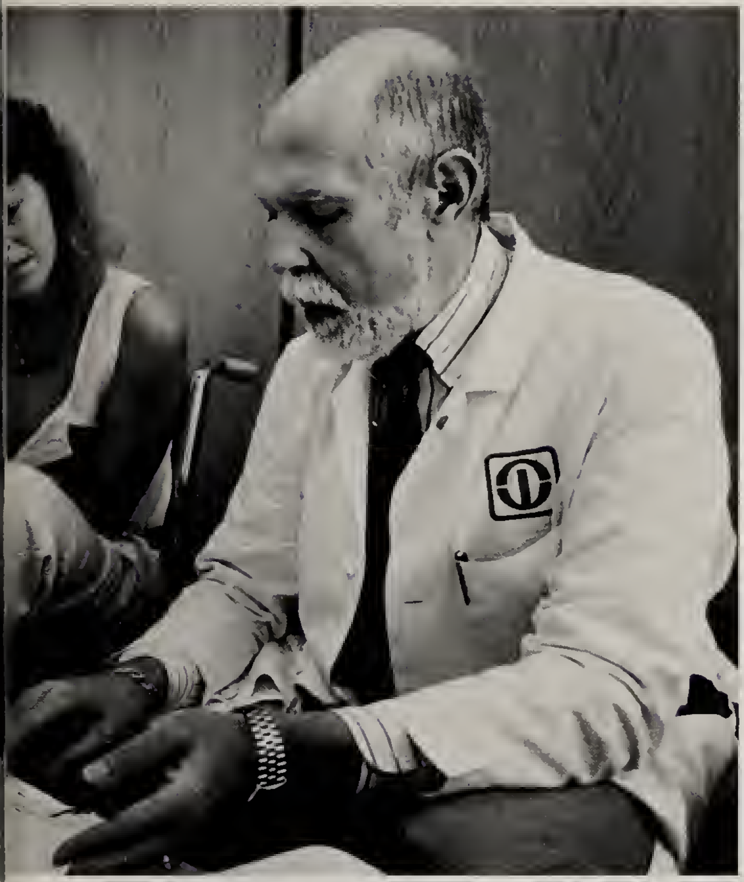
Parents, whose primary role is to protect and nurture, often find themselves feeling helpless and unprepared to support their child in pain.

As a parent, what can you do? There are steps you can take to help make a painful experience a little less distressing for your child (and yourself). These interventions can be divided into three categories: 1) preparing your child for the experience, 2) becoming involved in helping your child relax, including distracting him or her during a painful experience, and 3) talking with nurses and doctors about what you think your child is feeling.

Prepare Your Child

Some parents think their children handle pain better if they don't know when it will occur. However, studies have shown that children who were told about the impending pain — what would happen as well as how it would feel — were much less distressed and reported feeling less pain than children who weren't prepared. In fact, children told to expect no discomfort were the most distressed.

It is important for your child to know that pain may occur during a procedure, after surgery or during an illness. Children may ask about how much pain there will be and how long it will last. Although it is often difficult for a parent to know exact answers to these questions, doctors and nurses can provide some estimates based on their experience.



Robert L. Barkin, Pharm.D.

and we must constantly listen to the patient and develop interventions directed at those needs," says Robert L. Barkin, Pharm.D.

But research shows that pain assessment in hospitals across the U.S. remains inadequate. In a Rush study conducted in the mid-1980s, hospitalized patients were asked to rate their pain on an objective scale. Within the hour, each patient's physician and nurse were asked to describe the patient's pain on the same scale.

"We found no correlation between the health care workers' perception of a patient's pain and the patient's self-report. What's more, this finding has been observed in numerous studies at hospitals across the country," says clinical nurse specialist Judith A. Paice, M.S., R.N.

"This implies that we make too many assumptions about pain," Paice continues. "Health care workers assume that patients will tell them when they're in pain, but in reality, many patients won't volunteer those facts — they wait to be asked. We have a real communication gap here."

Unlike other aspects of illness, the success or failure of pain management often isn't documented systematically. Recognizing this, Rush nurses have established clear guidelines for assessing pain, and measuring and documenting the outcome of treatment.

Using these guidelines, nurses develop an individual "pain profile" for the patient. First, a baseline

Help Your Child Cope

In many situations, pain medications are the best option, especially when the pain is not short term. However, relaxation and distraction are two techniques you can use that reduce most children's perceptions of the amount of pain they feel. These techniques can be used together with medication or, if medication is not considered beneficial (as for a short procedure), in place of it.

Relaxation techniques can be especially effective because the child trusts you and enjoys the comfort of your touch or the sound of your soothing voice. The techniques you use can be quite simple. Help your child find a comfortable position. Draw a warm bath. Dim the lights, turn on quiet music, tell a story. These techniques can help relax children of all ages.

The purpose of distraction is to use everyday, external stimuli to compete with pain for the child's attention. Any parent who has tried to get a child's attention during a television cartoon is well aware of the effectiveness of distraction.

Techniques doctors and nurses use with children include focusing their attention on a bright, interesting object (such as a picture of the Ninja Turtles or Cinderella); telling action-oriented stories; or teaching them simple, relaxing breathing patterns. For adolescents, listening to rock music through earphones is a useful distraction.

Advocate for Your Child

Parents know their child better than anyone else and can be especially helpful to the physician or nurse when they are interpreting their child's behavior and reports of pain.

Yet parents often think that doctors and nurses "know best" and can decide without parents' input whether and how much a child is hurting.

In fact, optimal care of children in pain requires a partnership between parents and health professionals. Health professionals should describe how much pain can be expected in a certain situation and how most children respond. Parents then relate how their child usually handles pain and whether the child's behavior resembles the typical reaction. Working together, parents, doctors and nurses can make the best decision about what to do for the child.

Marion E. Broome, Ph.D., R.N.

Reprinted from the July 1991 issue of *Chicago Parent News.*

assessment of the intensity and location of a patient's pain is established. The quality of the patient's pain — for example, is it a dull ache or a stabbing, burning sensation? — is also considered.

"We interview patients and have them rate the intensity of their pain on a 10-point scale, a score of 10 being the worst pain they could possibly imagine," says Wickham, who developed the pain profile guidelines.

After the baseline evaluation, patients are assessed at regular intervals — at least twice a day. The success of a treatment is measured by how well it improves the baseline pain "score."

Pediatric pain warrants unique assessment strategies. "Children aren't always able to articulate the quality and intensity of their pain," explains Marion E. Broome, Ph.D., R.N., associate professor and assistant chairperson, maternal-child nursing.

Instead of a numerical scale, Dr. Broome asks children, 4-12 years of age, to describe the way they feel on a five-face scale, from frowning to smiling.

It's just in the past 10 years that infant pain has even been acknowledged.

"There was a longstanding misconception among health care workers that children under age two either didn't feel pain, or didn't remember painful experiences," says Virginia Maikler, Ph.D., R.N., assistant professor, maternal-child nursing. "Infants still often aren't medicated for painful procedures that adults are medicated for."

Assessing infant pain can be especially challenging.

"If the infant has had surgery or sustained an injury, we expect pain. But when there's no verifiable cause, pain is harder to detect," says Dr. Maikler.

She observes both physiological and behavioral cues such as increased heart rate, crying and agitation. Additionally, parents provide valuable information regarding their infant's behavior. Interventions are then evaluated by how well they relieve these symptoms.

For chronic pain, Timothy R. Lubenow, M.D. (right), performs nerve blocks, which offer patients temporary relief, allowing them to undergo physical therapy to prevent muscle deterioration and disability.

Team Approach

Whatever the patient's age, pain is a problem that crosses all medical disciplines. "Pain is multifaceted," says Dr. Ivankovich. "No one physician is adequately trained to cope with the various medical, psychological and behavioral aspects of pain. It requires an organized effort, involving experts from many specialties."

The Rush Pain Center is one of the oldest programs in the country devoted to the management of pain. As director of the Center, Dr. Ivankovich espouses multidisciplinary management of acute and chronic pain. The Center's staff includes anesthesiologists, family practice physicians, nurses, a pharmacologist and a psychologist. Rush inpatients and outpatients are offered a wide range of treatments, from medication to acupuncture. The Center's staff also works closely with specialists in orthopedic surgery, neurosurgery, neurology, physical medicine and rehabilitation and others.

Another example of the "team" approach is Rush's innovative pediatric pain team. Children who have undergone surgery or who suffer from chronic illnesses with pain as a component are evaluated by the five-member team. The members meet twice weekly, compare notes and develop individualized pain care plans.

Anthony J. Richtsmeier, Jr., M.D., and Maryann Alexander, M.S., R.N., both pediatric pain team members, on patient rounds.

In existence for nearly three years, the pediatric pain team consists of nurse researchers Drs. Broome and Maikler; pharmacologist/pharmacist Dr. Barkin; behavioral pediatrician Anthony J. Richtsmeier, Jr., M.D.; and clinical nurse specialist Maryann Alexander, M.S., R.N.

"We each bring to the group a different perspective, different focus of intervention and distinct role in the management of pain," explains Alexander, who specializes in treating children's pain related to orthopedic injuries and surgeries.

"Together, we solve problems that we couldn't solve alone," adds Dr. Richtsmeier. "It's the sharing of expertise that makes the team work."

Dr. Richtsmeier's clinical background in pediatrics and psychiatry help him deal with both medical and psychological aspects of children's pain.

"For a child too young to understand what's happening, medical procedures can be particularly frightening," says Dr. Richtsmeier. "In addition to pain, we must treat distress."

The team emphasizes education — not only of patients and families, but other medical professionals. In this capacity, Dr. Richtsmeier instructs first-year medical residents about physiological, psychological and pharmacological aspects of pediatric pain.

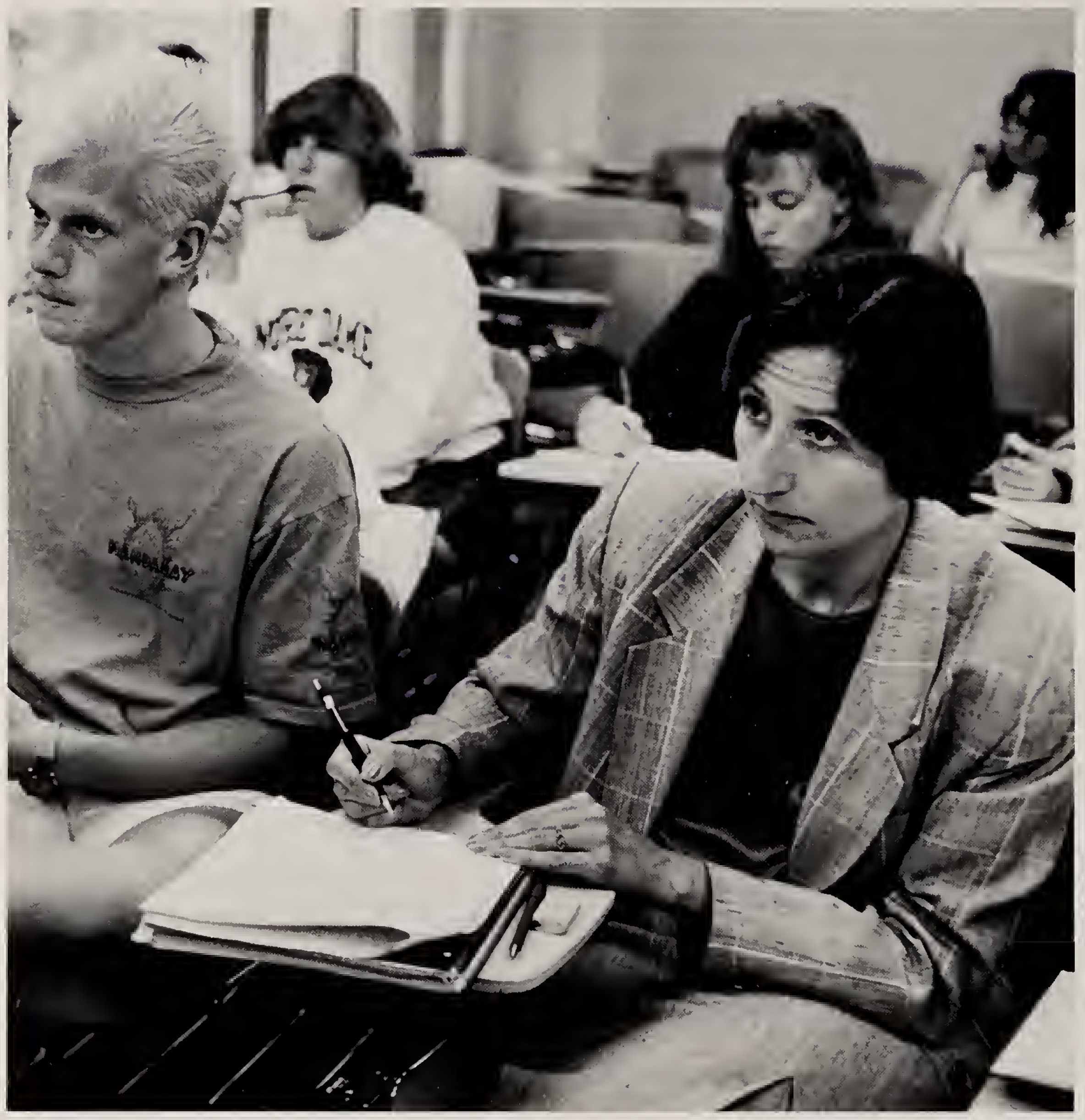
"One of our challenges is getting health care professionals to make the child's comfort more of a priority," says Dr. Richtsmeier. Research conducted by all five team members adds credence to their recommendations for clinical care.

Meeting the Challenge

Improved technology and assessment techniques don't insure that all pain can be overcome, but they do provide more opportunities for relief.

Twenty years ago, because of inadequate knowledge and misconceptions, much acute pain, including cancer pain, was poorly relieved. Chronic pain was all but ignored.

"Years ago, with no help in sight, this illness would have ruined my life," says chronic pain patient Hyzny. "Now, thanks to new treatments, I can work and socialize. It's still no picnic, but at least there's hope." — *C.J.*



Graduate Entry Level student Janice Taczy (right), formerly an accountant, takes notes during an anatomy and physiology lecture.

Changing Faces

Nursing attracts a new breed of students.

by Barbara Harfmann

An accountant for 13 years, Janice Taczy, 35, recently traded in her business suit, computer and calculator for white shoes, anatomy and physiology textbooks, and a stethoscope.

Emmanuel Anderson, Ph.D., 48, was a teacher at an inner city high school when a Rush admissions counselor came to discuss nursing careers with his class. Six months later the science teacher himself became a nursing student.

Linda McClintock also decided to go back to school. Now the mother of 18-month-old Raymond, she, like many of her classmates, is busily trying to balance the demands of nursing school with marriage and family.

Fifty-year-old Pat Cahill found herself out of a job when the high school where she taught science closed. What she discovered then was that many new avenues could be opened to her with an education in nursing.

There was a time when students like Taczy, Anderson, McClintock and Cahill were a rarity. Not so today. It's becoming more and more common for nursing students to be older, many of them with college degrees in other fields.

Rush University College of Nursing is one of only a handful of the more than 1,400 nursing schools nationwide to offer a program tailored to students who wish to change careers. Case Western Reserve and Vanderbilt University offer similar programs.

At Rush, a Graduate Entry Level (GEL) student can earn a master's degree in nursing in as little as 18 months. Students range in age from 21 to 55 and have come from such diverse backgrounds as engineering, teaching, the Peace Corps, medical technology, exercise physiology, economics and psychology.

"The GEL program is bringing a whole new breed of students into the profession and we find this very exciting," says Kathleen Gainor Andreoli, D.S.N., the John L. and Helen Kellogg Dean of the College of Nursing and vice president for nursing affairs at the Medical Center.

"A new 40-year-old RN and a 22-year-old RN both make approximately the same salary, but with the GEL graduate, we get 20 more years of decision-making, problem-solving and life skills," says Dr. Andreoli.

GEL was first offered as an option to students at Rush in 1988 and each year since then has seen a steady increase in enrollment. According to Phyllis Peterson, M.Ed., director, College Admission Services, 1990-91 applications were up 78 percent for non-nurses with college degrees. "We had more applicants than we had space available," she says.

Of her decision to pursue nursing, former science teacher Cahill says, "Nursing will allow me to utilize my science background. It requires a good mix of people skills and I feel that my age and the experience I've acquired will help me relate to my patients."

A second-year GEL student, Anderson spent this past summer gaining clinical experience as a nursing assistant at the Medical Center. He also became involved in collecting data for clinical research on pressure sores in geriatric patients.

"I've come to appreciate the importance of nursing in health care and to realize what a vital role nurses play," he says. "Doctors, because of the nature of their work, can only spend a limited time with patients, but nurses are there 24 hours a day. As the primary caregiver, a nurse becomes the patient's friend and confidant."

Accountant-turned-nursing student Taczy grappled with the idea of becoming a nurse for seven years before enrolling as a GEL student at Rush. As she puts it, "I was making good money and my job allowed me to travel all over the U.S., but I wasn't really happy. I just didn't feel I was contributing to society."

Taczy believes her business background will enhance her future career as an oncology nurse. "I'm used to dealing with people, handling a huge work load and delegating responsibility. You have to react to crisis situations in business — I'll just be doing it in another profession."

McClintock says she enjoyed her eight-year career as an exercise physiologist, but felt limited. "There was no upward mobility. I craved more direct patient contact and more control over my career. Nursing was the perfect solution."

> ***"I've come to appreciate the importance of nursing in health care and to realize what a vital role nurses play."***

Stability and Flexibility

Nursing is finally getting the respect it deserves. In the wake of a national nursing shortage, nurses are in great demand. Salaries at Rush now range from $30,000 to $60,000 annually. Nursing school enrollments, which had dipped precipitously in the mid-'80s, are again on the rise.

Reasons for the increase are varied. "Interest is high in nursing today because it offers career stability and flexibility, as well as a variety of opportunities," says Barbara Haynes, Ph.D., R.N., director of student support services at Rush.

At Rush, 459 students are enrolled this year compared to 426 in 1990.

Nationally, nursing school enrollments have increased 10 percent. According to the National League for Nursing (NLN), the 1,429 nursing schools around the country reported a fall 1990 total enrollment of 220,000 students in associate, baccalaureate and graduate degree programs.

Men and Minorities

Ninety-four percent of today's nurses are white women, but statistics show that the gender gap may be narrowing. At Rush, men account for 15 percent of under-

Barbara Haynes, Ph.D., R.N., director of student support services, counsels second-year student Kim Espino.

Graduate Entry Level students practice new skills on patient mannequins in the Nursing Resource Laboratory.

graduate and GEL students, more than double the national average of 5.9 percent (based on NLN 1988-1989 statistics). Nearly 12 percent of Rush undergraduate students represent minority groups, including African-American, Hispanic, Asian and American Indian.

Courtney Lyder, N.D., R.N., is a three-time graduate of the Rush College of Nursing. He earned a bachelor's degree in 1989, a master's in gerontological nursing in 1990 and, on June 8 of this year — also his 25th birthday — he received a doctor of nursing degree. One of fewer than 10 black men in the nation to hold a doctorate in nursing, Dr. Lyder serves as a role model for minorities and men.

"As you bring more men and minorities into nursing, it will strengthen the profession. I tell whoever will listen that nursing is a fabulous profession. It's challenging, diverse, and you'll always have a job."

Intrigued by research, Dr. Lyder is studying the efficacy of a structured skin care regimen to prevent diaper dermatitis in incontinent geriatric psychiatric patients. An article he wrote, on sexuality in the elderly, will be published this fall.

Nursing in Another Era

To say that nursing students — and the profession — have changed is an understatement after listening to Ruth Schmidt's vivid recollections of life as a nursing student in the early 1930s.

A 1934 graduate of the Presbyterian Hospital School of Nursing,

Educational Options

Maintaining its commitment to innovation and diversity in education, the Rush University College of Nursing offers degrees at every level — the bachelor of science (B.S.), master of science (M.S.), master of science-master of management (M.S.-M.M.), doctor of nursing (N.D.), and doctor of nursing science (D.N.Sc.).

"Of the 20 nursing schools in Illinois, Rush offers the most degree options and we are also one of just a few schools nationwide to offer a doctor of nursing degree and a doctor of nursing science degree," says Kathleen Gainor Andreoli, D.S.N., the John L. and Helen Kellogg Dean of the College of Nursing and vice president, nursing affairs.

"Whether our students wish to pursue clinical practice, research or management, we have a program to meet their needs."

Graduate students select one of six departments in the college — community health nursing, gerontological nursing, maternal-child nursing, medical nursing, psychiatric nursing or surgical nursing. Study can be focused either within the selected department or across departmental lines to allow for specialization according to a physiological entity, age group or practice setting.

Initiated by a grant from The Commonwealth Fund and offered in conjunction with Northwestern University, the M.S.-M.M. program prepares nurses for management careers in the increasingly complex world of health care organizations.

The N.D. program is "the hallmark of graduate study for practitioners," says Barbara Haynes, Ph.D., R.N., director of student support services. The focus is clinical practice with emphasis on the application of research to patient care and health care policy.

The D.N.Sc. graduate is the "ultimate change agent in nursing," according to Dr. Haynes. These graduates conduct clinical studies to advance the body of knowledge in nursing and may develop health policy.

Dr. Andreoli concludes, "Regardless of the program, nurses educated at Rush have the life skills and intellectual flexibility needed for today's diverse health care system."

Schmidt recalls that "Probies" (as students were called in their first six months of training) worked in the pharmacy weighing and filling paper packets and capsules. In the diet kitchen, they prepared food for ulcer and diabetic patients.

"Nurses today do not have to prepare saline solutions or sterilize syringes and needles as disposable paper drapes, gloves, syringes, needles, and tubing are routinely used," Schmidt says.

Even 25 years ago the nursing school environment was drastically different. It was a time when nursing and teaching were virtually the only career opportunities for women. Students then were primarily white, unmarried women who entered school when they were 18 and just out of high school.

Karen Lamb, N.D., R.N., who just received her Doctor of Nursing degree from Rush this past June, recalls her earlier days as a student at Presbyterian-St. Luke's Hospital School of Nursing in 1965.

"Our education, which was advanced beyond many other diploma schools of nursing, hadn't attained today's level of professionalism. Health care wasn't as complex or technologically advanced and there was virtually no research base."

Research is a main focus for Joyce K. Keithley, D.N.Sc., F.A.A.N., chairperson of OR/surgical nursing at Rush. She first became interested in research as a student and today is recognized nationally for her clinical studies on nutrition in surgical patients. She is currently exploring the complex relationship between nutrition, immune status and HIV infection.

Research, Dr. Keithley maintains, is crucial for the nursing profession.

"Nurses must continuously strengthen and expand beyond the scientific base that guides their practice," says Dr. Keithley.

"Nursing research leads to the development and refinement of nursing interventions that promote optimal patient care and improve patient outcomes."

According to Dr. Haynes, the curriculum at Rush reflects the fact that nursing has grown beyond general practice to include clinical specialists, nurse researchers and managers.

Innovative programs like the GEL are attracting more people into nursing and addressing the demands of a changing health care system.

"Nursing is infinitely more complex today than 25 years ago," Dr. Andreoli says. "We have an exploding home health care market, sicker patients, and cost constraints that are no longer tolerable."

Adds Dr. Haynes, "With nurses of all ages, cultures and religions, we will better meet the needs of our diverse health care population. Regardless of the demographics, however, patients and their families will remain at the heart of nursing. The patient must always come first."

What Hospice Meant to My Family

by Carol Keenan

My mother and I were patients in the Rush-Presbyterian-St. Luke's Alzheimer's Family Care Hospice for 10 days short of six months. Without the program, Mom would not have been able to die at home in peace and with dignity. And I would have had devastating physical, emotional and financial problems.

When we became a hospice family, my mother was bedbound but able to get out of bed with assistance; incontinent, although she could be lifted to a commode; and almost mute — within a month she was capable of stringing together only four words at most. She'd always been a strapping woman, but she'd shrunk to a size 6 or 8.

My life had become a nightmare as I watched my mother revert to an infant-like state. I was exhausted and I felt isolated and out of the mainstream. As a single person and only child, I was completely responsible for my mother. My father had been dead for 30 years, and my closest relative, who lived out of state, visited about every three months.

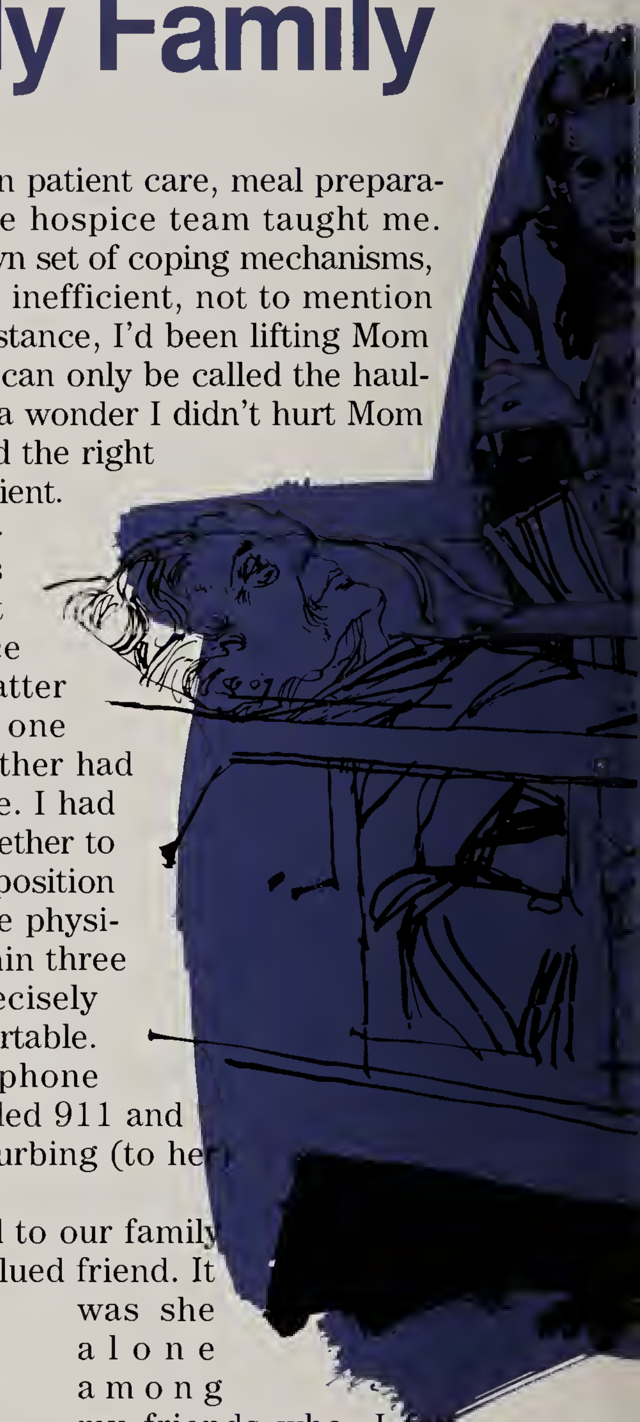
My friends thought I was taking on too much. With the best intentions and with concerns about my welfare, they gently urged me to put Mom in a nursing home. I was violently opposed, but I was beginning to feel so out of control that I was afraid I was going to have to start arranging for institutional placement.

In that frame of mind, I first made contact with the hospice team. After preliminary interviews and an examination of Mom by the hospice medical staff, we were accepted into the program. I remember crying when I hung up the phone after learning of our acceptance; I finally had someone on my side.

> ***The volunteer assigned to our family became a trusted and valued friend.***

The first advice I got from the hospice team was simple and life-saving. I had been sleeping in my mother's room to prevent her from falling out of bed or kicking off the diaper I put on her at night. This was not an arrangement destined to give me a good night's sleep and certainly contributed to my exhaustion. The hospice nurse took one look at the situation and said, "You're not doing anyone any good if you're dead tired. Find a hospital bed for your mother and don't feel guilty about leaving her alone." From then on, I got several hours of uninterrupted sleep at night.

That practical advice was just the beginning of a series of wonderful strategies on patient care, meal preparation, and so on, that the hospice team taught me. Though I'd evolved my own set of coping mechanisms, many of them were very inefficient, not to mention downright wrong. For instance, I'd been lifting Mom to the commode in what can only be called the haul-and-drag method. It was a wonder I didn't hurt Mom or myself before I learned the right way to lift a bedbound patient.



Throughout our participation in hospice, I was reassured by the fact that I could call the hospice team at any time, no matter what the problem. Late one night, I was positive mother had had another small stroke. I had no idea what to do — whether to give medication, how to position her bed, etc. The hospice physician called me back within three minutes and told me precisely how to keep Mom comfortable. Without such 24-hour phone access, I would have called 911 and subjected Mom to a disturbing (to her) trip to the hospital.

The volunteer assigned to our family became a trusted and valued friend. It was she alone among my friends who, I felt, understood what we were going through. In small ways, such as bringing a little plant or loaning me a book from her own collection, she made me remember that I was still a person in my own right. And in more weighty issues, such as dealing with insurance forms and sorting out home care and funeral options, she proved a wise counselor and one-woman support system.

When my mother's death was imminent, the hospice team stood behind us at every significant turn. They prepared me for what would happen to Mom physically and kept in touch at least once a day. Our volunteer joined my friends and me in a vigil that was sad yet as upbeat as we could make it. I'll never forget her sitting on our living room floor to help make the funeral wreaths I'd decided to use instead of more traditional flower arrangements.

My mother has been dead for several months now. As I look back, I know I could not have kept her at home without participating in hospice. At the very least, she would have had to suffer through several costly hospital admissions that would have done nothing to improve her quality of life. As for me, I'm grateful every day that, with hospice, I was able to help my mother achieve what I know she wanted — to die peacefully at home. ⓘ

Reprinted from the *RADC News*, a publication of the Rush Alzheimer's Disease Center.

A Concern for Dignity

by Justine Ringhofer

Like Carol Keenan, family members who choose to continue caring for their loved ones at home during the terminal stages of Alzheimer's Disease experience many frustrations. The Alzheimer's Family Care Hospice, a service of the Rush Alzheimer's Disease Center, was the first hospice in the country tailored to meet the needs of patients with dementia and their families. Since it was established three years ago, the hospice has served 25 such families on the city's north side and neighboring suburbs.

The hospice team includes social workers, nurses, physicians and trained volunteers. Services are provided free of charge.

"Hospice stresses a palliative care philosophy," explains Brigid Brechling, L.C.S.W., executive director.

"We don't use resuscitation or artificial life support systems. Our philosophy is to improve the patient's quality of life without trying to extend it beyond its normal course," says Brechling. "Families must understand that before they enter the program."

"Once a patient is accepted, a hospice team member visits the caregiver and makes a home assessment. Recommendations may be made for special equipment such as a wheelchair or special mattress. Caregivers are assured access to emotional services, either by phone or a personal visit. Services are also available 24 hours a day for crisis situations.

Brechling admits there's a blurring of roles once a staff member gets inside a caregiver's home. "Because of the emotional nature of the illness and the many medical problems which can arise, nurses sometimes become listeners, while social workers might report a possible medical problem."

Volunteers offer respite, allowing caregivers to get away from their caregiving duties for a few hours a week. Homemaker services provide "helpers" who run errands or complete chores.

"Our volunteers are trained to understand Alzheimer's disease and the grief and loss that go along with it," says Brechling. "They are all very good listeners, which helps caregivers tremendously."

Moving Parts

With new designs and advances in surgery, knee replacement is becoming an option for younger, active patients.

by Sue Jeantheau

Just 20 years ago total knee replacement surgery was considered a last resort. It was a new procedure that orthopedic surgeons reserved for those in their 70s and 80s who suffered with the crippling pain of severe arthritis. The objective was to get the patient out of a wheelchair and to offer perhaps 10 years of slightly improved maneuverability.

Since then, knee prostheses and surgical techniques have greatly improved. Today, surgeons perform as many as 100,000 total knee replacements every year, and more active patients — in their 60s, 50s and even younger — are now able to benefit from the procedure.

This younger patient population has created new challenges for orthopedic research. Younger patients need implants to last them their lifetimes, which could mean as many as 30 or 40 more years. Researchers are also investigating ways to restore normal knee function so patients can resume activities that had been interrupted because of arthritis or injury.

To improve the quality of life for patients, investigators are conducting biomechanical analyses of the knee, as well as looking at the design and manufacture of knee prostheses and exploring approaches to joint replacement surgery.

An Inside Look

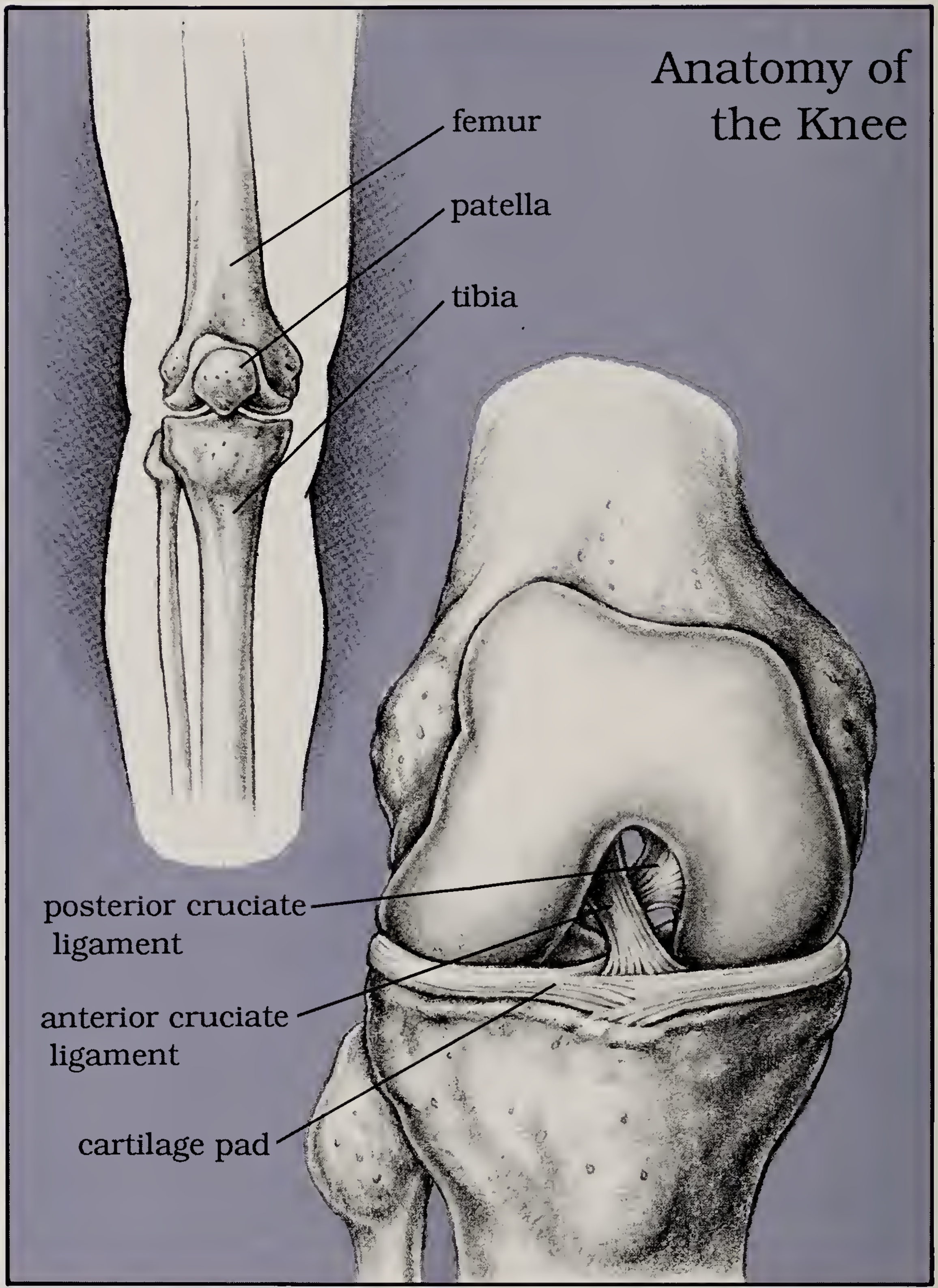
A look at the knee from the inside explains why injury is common and replacement is complex.

Stair climbing tests the flexing, extending and weight-bearing capabilities of the knee.

We call it "the knee joint," but the knee is actually a compilation of three smaller joints: one between the femur (thigh bone) and the patella (kneecap), and two between the femur and the tibia (shin bone). Four major ligaments hold these bones together, with cartilage covering the surfaces.

"The knee joint is one of the more complicated joints in the body," says Thomas Andriacchi, Ph.D., the Claude N. Lambert, M.D.-Helen S. Thomson Professor of Orthopedic Surgery and director of orthopedic research. "It's the most unstable

Lost bone and tissue are restored in knee replacement surgery.



Upper left: The knee connects the femur, patella and tibia. Lower right: Knee flexed, patella removed, to show ligaments.

joint because it connects two bones that don't directly mate with one another."

These two bones, the femur and the tibia, are also the two largest levers in the body. A third bone, the patella, is not attached but suspended in place by ligaments between the femur and tibia.

Maybe you aren't aware of the intricacies of the joint that keeps you standing, helps you bend down to pick up your kids, or gives you support when racing up the stairs. If you haven't thought about your knees, you probably haven't thought about how you might function without them.

The knee's unique ability to twist and rotate distinguishes it from other joints in the body. While executing such movement, this powerful joint can also withstand tremendous stresses, up to four or five times the weight of the body. (For a jogging, 175-pound man, that's some 800 pounds of force.)

The knee's delicate nature and its need to handle great loads also make it vulnerable to injury. Ligament tears can affect the joint's fluid operation. Degenerative changes, like arthritis, can also occur. In arthritis, the cartilage that cushions the ends of knee bones breaks down, resulting in pain and stiffness.

Surgical Options

Medications, treatments and minor surgical procedures can provide temporary relief. But when these aids fail, total replacement of the worn tissue and bone becomes an option. At Rush, surgeons perform between 150 and 200 total knee replacement procedures a year.

In total knee replacement, the surgeon implants three components. The femoral prosthesis is placed at the bottom of the femur, the tibial plate caps the top of the tibia, and the patellar prosthesis replaces the full kneecap.

Initially, implantation of knee prostheses focused on replacing only the injured portion and not the entire knee. Surgeons now consider the nature of the patient's injury before choosing whether to perform unicompartmental replacement or total knee replacement.

Early researchers assumed the knee behaved primarily as a hinge, simply capable of producing a back and forth motion. So they designed hinge prostheses for the knee to recreate this basic swinging motion. But the hinge design could not duplicate the more subtle knee movements, thereby limiting a patient's overall function.

After knee replacement surgery, Carol Offill can again enjoy activities like gardening.

Thus researchers began to explore more advanced prosthesis design. Today, there are several hundred models of total knee replacement prostheses.

The newer anatomic designs have been created with data obtained from computer analysis and patient response, largely from research at Rush.

Biomechanical study of the knee joint began at Rush with the opening of the John L. and Beatrice Keeshin Human Motion Research Laboratory in 1977. There, researchers use mathematical models, stress (load) analyses, and gait analyses (walking, running, stair climbing) to measure an implant's functional success. The data collected help investigators better understand the nature of the knee to design a more natural knee prosthesis.

"We don't have the same design criteria today as we had 15 or 20 years ago," explains Dr. Andriacchi. "Also, the time that a device has to function for, the patient's lifetime, is now much greater — 30 or 40 years rather than 10 or 15 years — and the patients are more active."

Moving Without Pain

Carol Offill is one such active patient. She contracted arthritis in her knees when she was in her 20s. Despite taking medications for many years, she became so stiff-legged that she could not bend her knees.

"I enjoyed yardwork, but I used to let things go because I was in so much pain," she says. "My doctor told me that I was too young and too active for a knee replacement — that it would be undone in two years."

Offill lived with the pain until she could no longer tolerate its impact on her lifestyle. She received a referral to Rush to see Jorge O. Galante, M.D., D.M.Sc., the William A. Hark, M.D.-Susanne G. Swift Professor and chairman of orthopedic surgery. Dr. Galante, who is also director of the Rush Arthritis and Orthopedic Institute, gave Offill a new option: cementless total knee replacement. Last July, she had both knees replaced with this method.

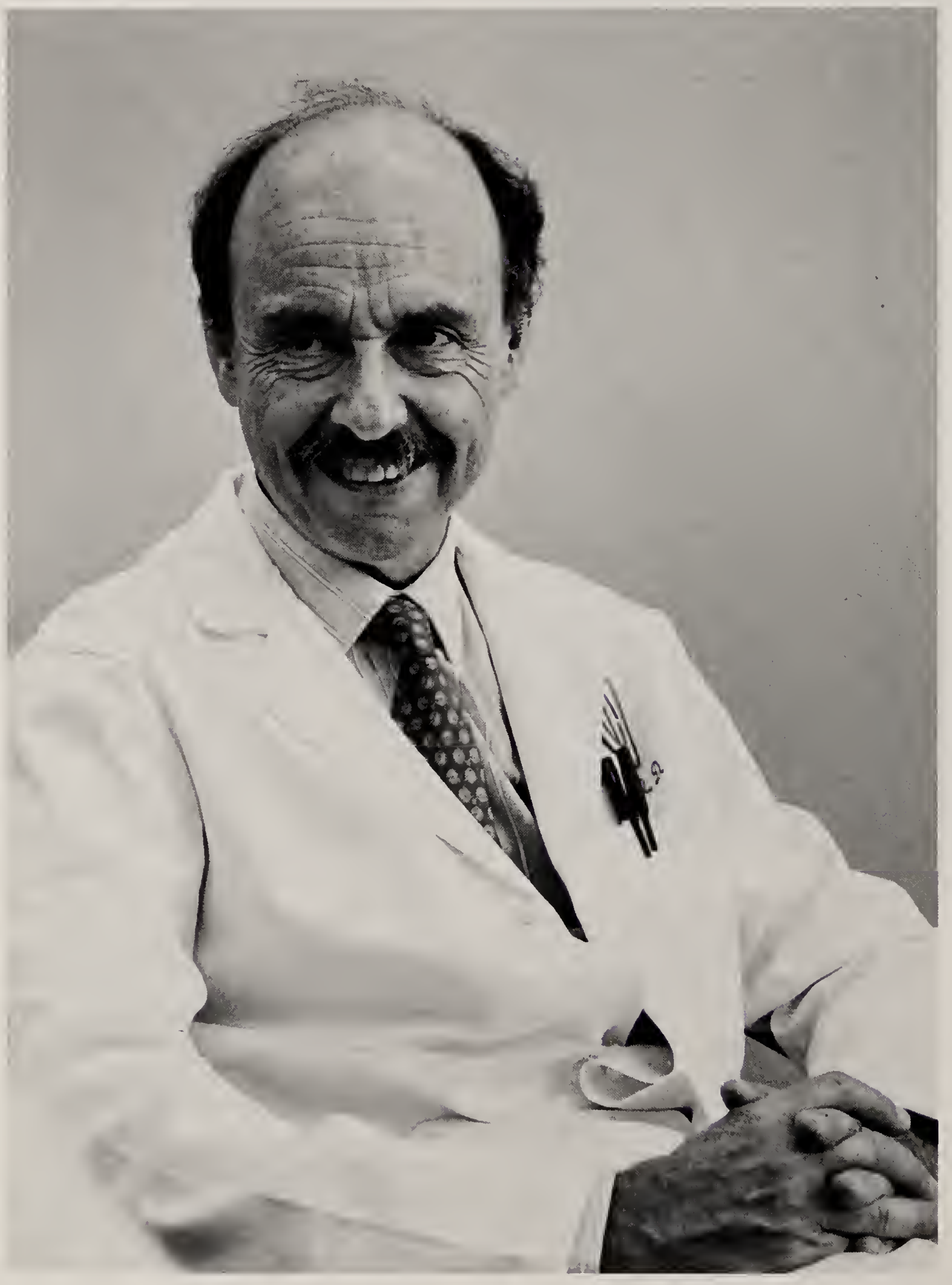
"Dr. Galante told me that my new knees would help me do everyday things without pain. Now I'm cutting the grass," she says. "A year to the day of my surgery, I was walking around Great America amusement park with my family. I even went on some of the rides.

"My kids say I have a new personality," she adds. "I have a whole new life. My new knees have made me 20 years younger!"

A Permanent Fit

The concept of cementless fixation took hold in the early 1970s. Rush researchers embraced the approach because they wanted to provide a more permanent fit for cases, like Offill's, where a prosthesis would be needed for many years. Cementless fixation looked promising because it seemed to allow for a strong, natural bond.

When total knee replacements were first done in the late 1960s, surgeons cemented prostheses in place. Englishman Sir John Charnley introduced methyl methacrylate, a cement, in the late 1950s as a means to affix prosthesis to bone. But by the early 1970s, Dr. Galante and his colleagues found that many implant failures occurred where the cement met the bone. The rubbing of bone against prosthesis created particles of cement that irritated tissue and eventually loosened the implant.



For his cementless experiments, Dr. Galante fashioned a fibrous titanium mat, resembling a hard steel wool pad, to fit the shape of the joint's missing bone. Because of its porous surface, the mat permitted ingrowth of new bone, cartilage and blood vessels. Such ingrowth makes a biological bond that researchers believe will preserve more bone and provide greater stability than cement over time.

The choice of titanium was significant. In the late 1960s, in collaboration with the late William Rostoker, Ph.D., professor of metallurgy at the University of Illinois, Dr. Galante developed "fiber metal," the titanium alloy used in these bone ingrowth experiments. Originally, commercial manufacturers used light-weight titanium to build airplanes. In the late 1950s, surgeons in England and Ireland used titanium prostheses to repair shattered bones and skulls. Experiments showed that the material was corrosion resistant and biocompatible, a necessity for a successful implant.

Manufacturers had first made knee prostheses of iron and steel, but the metals disintegrated once implanted: iron rusted and steel devices caused friction and often cracked. As the modern era of total knee replacement began, orthopedists experimented with other materials that they hoped would provide greater stability, longevity and biocompatibility.

Two of those materials, chromium-cobalt (a metallic alloy) and polyethylene (a plastic), have been shown to be tolerated by the body and today are commonly used in making implants. Both titanium and chromium-cobalt prostheses were designed to encourage bone ingrowth.

Jorge O. Galante, M.D., D.M.Sc., the William A. Hark, M.D.-Susanne G. Swift Professor and chairman of orthopedic surgery.

Research at Rush continues to study the effectiveness of cementless procedures using titanium as an implant material. In the meantime, surgical techniques using the cemented method have advanced.

> ***Improved function and stability are important measures of an implant's success.***

"The technology with cement has improved to a point that failure by loosening is not a common event anymore," says Dr. Galante.

For older, less agile patients, cemented prostheses perform well, because these patients generally put less stress on their knees, reducing the chance for loosening. Rush orthopedic surgeons implant cemented prostheses about 50 percent of the time.

Like Carol Offill, Fabian Fornall, an older patient, had arthritic knees. He received his cemented left knee in September 1989 and his cemented right knee in June 1990. Since cement fixes instantly, he could place full weight on his knees early in his recovery.

"My wife suffers from complicated health problems. She requires daily attention. That's why I opted for the cemented procedure," he says. "With the knee replacement, if you are healthy in body, you can have this procedure and recover quickly."

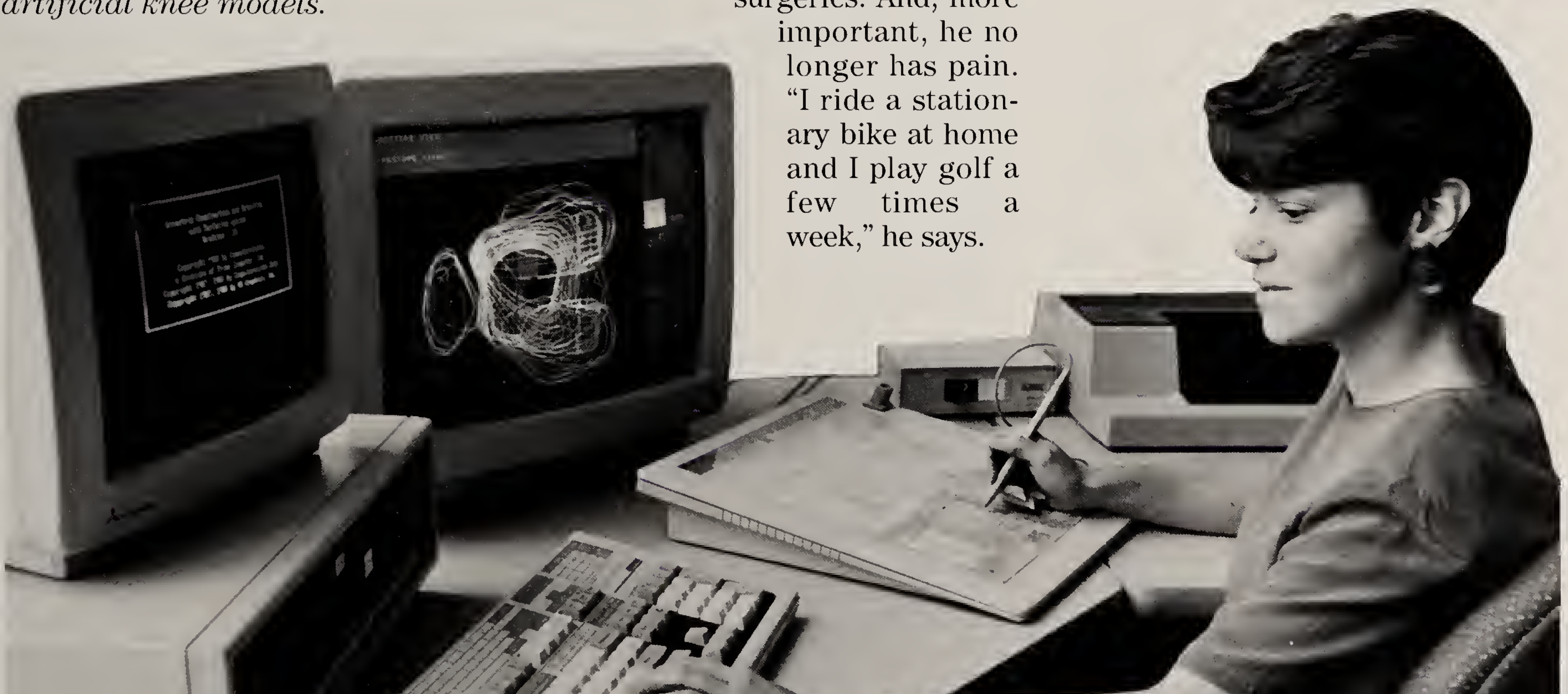
Fornall is more active now than before his total knee replacement surgeries. And, more important, he no longer has pain. "I ride a stationary bike at home and I play golf a few times a week," he says.

Improved function and stability are important measures of an implant's success. In 1989, the National Institutes of Health awarded a five-year grant to Rush researchers to examine the relationship between prosthesis design and bone ingrowth, which promotes both function and stability. Researchers also will study how bone remodels itself in the presence of such a prosthesis.

"What we've discovered so far is that the initial fixation strategy in cementless knee replacement influences the long-term stability of the implant," says Rick Sumner, Ph.D., assistant professor, orthopedic surgery.

Some implants contain pegs that align and secure the prosthesis in the bone. Surgeons drill holes in the affected bone to place the component and may use screws for added hold. Bone ingrowth should occur through the pegs and around the prosthesis.

Any movement of the implant dis-



Computer-aided design is used to evaluate the different artificial knee models.

courages bone ingrowth. In cases where the prosthesis has shifted or tilted, fibrous tissue may grow instead, which may not provide lifelong stability.

"We're trying to see if the short-term benefit of stability may have long-term costs in how the bone grows and remodels," says Dr. Sumner. "We want to design an implant in a way that's going to promote bone ingrowth."

As investigators search for ways to encourage stability and longevity in implants, surgeons face the task of treating total knee replacements that fail. Only one to five percent of patients develop failures in their artificial knees. In such instances, orthopedists may perform revision surgery.

"Forty percent of these cases are done because of infection. Prosthesis loosening, instability and stiffness in the joint itself make up the other 60 percent of the cases," says Aaron Rosenberg, M.D., assistant attending, orthopedic surgery.

Revision surgery is complex. It involves removing the original prosthesis, cleaning the damaged bone, treating infected areas with antibiotics (which takes several weeks), and finally inserting a new prosthesis. The major complications in revision surgery are bone loss and lack of stable ligaments for support.

Surgeons can replace lost bone with metal to enhance component stability. "Nobody's really studied the issue of what types of metal constructs are sufficiently stable," says Dr. Rosenberg. "We're just starting to look at the effectiveness of metallic wedges as a means to replace bone defects over the long term."

Surgeons can also replace weak bone with cadaver bone, called allograft, or with the patient's own living bone, an autograft.

"The allograft forms a scaffold that new bone may grow through," says Dr. Andriacchi. "Whether this replacement bone can grow quickly enough, before it resorbs the allograft (its structure), is not yet known."

If the allograft bone is resorbed before the new bone has grown strong enough, the component's stability will be jeopardized.

Researchers are now recovering bone materials from revision surgery patients to identify the causes leading to degeneration and destruction. To prevent total knee replacement failures, investigators continue to improve implant materials while proposing alternative methods to joint replacement.

Getting Better Results

"We now have a much better understanding of how porous materials are made and how other materials, like polyethylene, should be manufactured to obtain better results," says Dr. Galante. "For example, we've learned that titanium can be treated and polished to make the surface more wear-resis-

Why Does Cartilage Break Down?

by Carolyn Reed

Tough yet elastic, cartilage provides cushioning for your joints. A mere two to three millimeters thick, this tissue enables your joints to move easily. It can last a lifetime, but for many people it eventually deteriorates, causing pain and stiffness that may require joint replacement surgery.

No one really knows why cartilage begins to break down in the knee or any other joint, but studies in the Keeshin Human Motion Research Laboratory at Rush have indicated that the amount of physical stress on the joint is one factor.

Some stress on a joint seems to be beneficial. But too much is detrimental.

The patients studied had a severe form of bowleggedness and were scheduled to undergo corrective surgery.

"The bowlegged condition puts a significant amount of physical stress on the knee," said Thomas P. Andriacchi, Ph.D., the Lambert/Thomson Professor of Orthopedic Surgery and director of orthopedic research.

Patients were tested before and after surgery. Measurements after surgery showed there was less stress on the knee and patients said their knee pain had eased.

"I suspected that reduced stress on the cartilage was why they felt better, but I wanted to know in what way lessened stress affected the tissue. Since our biochemists specialize in cartilage research, I asked them if there was a way we could test the effect of physical stress on cartilage cells in the lab," he said.

Work began several years ago with James Kimura, Ph.D. (now at Henry Ford Hospital in Detroit), whose in vitro model was used to find out if it was even possible to measure tiny amounts of physical stress at the cellular level. It was.

tant and give the prosthesis longer life.”

Rush’s latest research, from the combined efforts of orthopedic surgery and biochemistry, suggests implants themselves may someday become unnecessary. The ability to regenerate and transplant cartilage (see related story below) may provide a plausible anatomic alternative to metal or plastic implants.

“Metal, plastic and cement do not hold up like the human body does in terms of mechanical stress,” says Dr. Andriacchi. “All man-made materials break down in time, but the body gets stronger and stronger the more you use it.”

But until scientists perfect cartilage regeneration, implants will remain the means to get patients back in action. To help improve patients’ ability to function with new knees, enhancements continue to be made in knee replacement design.

In 1982, Dr. Andriacchi and colleagues reached a milestone in their research by concluding that the design of a knee replacement can influence function. “What we discovered was that patients can achieve more normal function by retaining the posterior cruciate ligament, one of the key ligaments connecting the femur to the tibia.”

The posterior cruciate ligament is so strong that it remains intact even in patients with severe arthritis. Testing prostheses that do not require surgical removal of this ligament, Dr. Andriacchi has shown that knee extension is maintained and patients can climb stairs more easily. The dynamic activity of stair climbing requires the knee to exhibit full flexing and extending as well as weight-bearing capability.

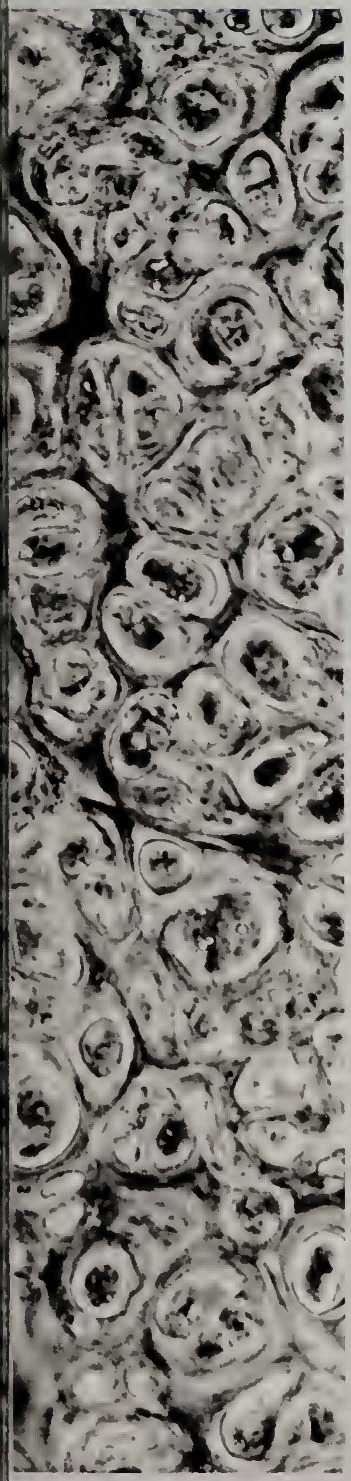
“There has always been a question of how much of the normal knee you can or should keep in a total knee replacement, and how much you should sacrifice to put in an artificial knee,” explains Dr. Andriacchi. “The more you try to approach normal function, the more you have to provide an artificial knee that is like the normal anatomy, which is complicated.”

In cases of severe deformity, where “off-the-shelf” prostheses would be unsuitable, a computer-aided design system can be used to create individually fitted devices. Rush uses such a system for research, to evaluate the shapes of artificial knees and to improve on their designs.

Computerized tomography, a CT scan, yields geometric sections of the knee that the computer-aided design system reconstructs into an implant design. When making an actual prosthesis, a computer-aided manufacturing system takes the design and automatically forms the implant from raw metal or plastic.

Research data also will help orthopedists find where anatomic problems may occur before patients need total knee replacement.

Dr. Andriacchi’s new work focuses on the anterior cruciate ligament, which also connects femur and tibia. The most frequently injured liga-



Now Margaret Aydelotte, Ph.D., associate professor of biochemistry, is beginning work with Dr. Andriacchi to test this question on living human cartilage cells, called chondrocytes.

“Cartilage is a very complex tissue,” says Dr. Aydelotte. “It’s hard to grow, yet it’s very resilient and we know that periodic stress alters its metabolism.”

Dr. Aydelotte has been studying the cell biology of cartilage for over 10 years. Her laboratory has refined methods to study chondrocyte metabolism, changes in the molecules synthesized within the cells. Using special gels of agarose or alginate, researchers can grow cartilage cells for extended periods of time and test the effects of different forms of stimulation on them. Then the cells are removed from the gel in order to analyze their responses.

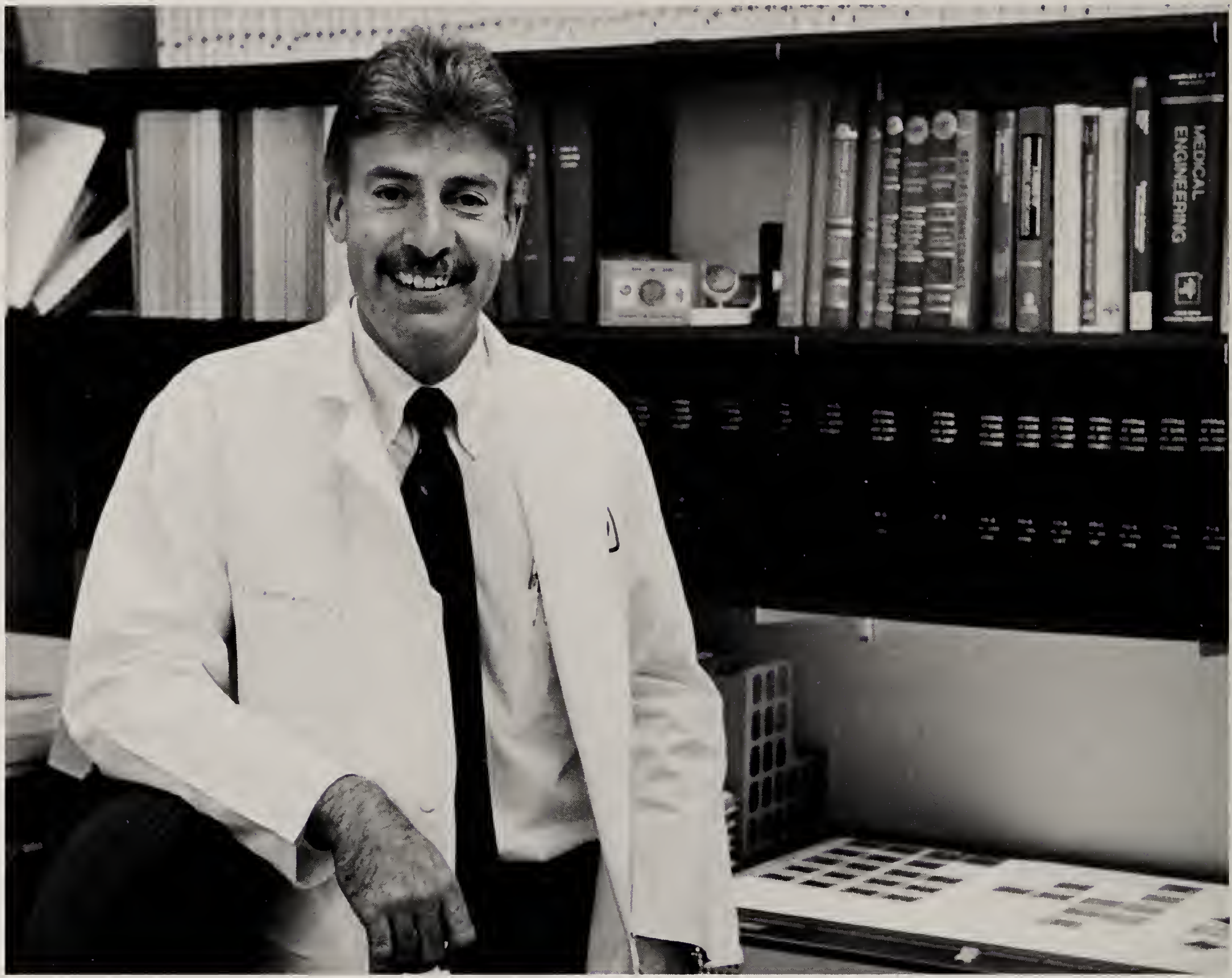
“We know that physical stress changes cartilage. And we know that cartilage is not the same throughout: it has a layered structure with the outermost layer acting like a tight protective skin. When that first layer has been damaged, we know that further stress quite quickly damages the deeper cartilage.”

Dr. Aydelotte thinks it may eventually be possible to reverse the damage in the very early stages. “But there’s a lot more we need to learn about these very complex cells,” she notes.

What Dr. Aydelotte and other researchers do know is that damaged cartilage has a basic metabolic imbalance. Learning more about that imbalance and how it might be corrected — physically, chemically or otherwise — could offer clues to new forms of treatment.

“We are trying to find a way to stimulate growth of new cells on the cartilage surface, to repair the damage the way cells in your skin heal a cut. That doesn’t normally happen with damaged cartilage. But I think it’s conceivable that in the near future we will learn how to stimulate repair, or at least retard the progression of cartilage degeneration.”

Bovine articular chondrocytes growing in culture in an agarose gel. Magnified.



Thomas Andriacchi, Ph.D., the Claude N. Lambert, M.D.-Helen S. Thomson Professor of Orthopedic Surgery and director of orthopedic research.

ment in sports-related activity, the anterior cruciate requires more repair and reconstruction than other knee ligaments.

Once this ligament ruptures, other tissues must sustain the loads placed on the knee, and they do not handle the stresses as well. The research will help predict which patients will do well without anterior cruciate ligament reconstruction and which patients will need the reconstruction.

"Where patients in their 70s or 80s would normally experience cartilage breakdown and arthritis, younger patients without an anterior cruciate ligament face the same problems in their 40s or 50s," says Dr. Andriacchi. "The concern is that some of these younger patients, in the long run, may have more severe problems requiring surgical intervention or even a total knee replacement."

Indeed, it is the younger patient who offers orthopedists a challenge. Excessive knee use and abuse and improper conditioning by these active individuals can lead to early knee injuries and further complications. While orthopedists are trying to avert these complications before the total knee replacement stage, patients can take comfort in the fact that knee replacement can provide a functional solution.

"I think the greatest challenge is being able to offer younger patients — younger physiologically as well as chronologically — the opportunity to be restored to a normal level of function," says Dr. Galante. "We want to be able to ascertain that what we do for our patients is long-standing — that it will last a lifetime." ①

Crossing Cultural Lines

Understanding leads to better health care.

by Nancy Stetson

Blood is red the world over, but attitudes about health and medical care differ widely from culture to culture.

Loy Thomas, director of Volunteer Services at the Medical Center, discovered this firsthand when she was hospitalized in Greece. "I speak Greek and know something about the culture, but that didn't make a difference," she says. "In Europe, when they do blood tests, they do a pin prick — but not in your finger, in your ear.

"Well, that was totally foreign to me. I was alarmed. I said, 'What are you doing?' Someone from another country who is hospitalized here may be equally disconcerted when we use the finger to get a blood sample, because they're used to the earlobe."

Divergent cultural norms may lead to misunderstandings in any setting. But their importance is magnified in hospitals, which can be frightening and foreign in themselves.

One woman undergoing a medical exam prior to hospitalization was annoyed because her Chinese physician wouldn't look at her. Was something wrong? Did he not want to be there? The doctor, following the norms of his culture, was simply showing respect by not looking directly at her.

Other groups, such as Native Americans and the Japanese, have similar customs regarding eye contact. Health care workers unaware of these customs might label patients who avert their eyes as passive, uninterested or resistant.

"Rush, like all the best institutions around the country, is training its staff to be more culturally sensitive," says Laurel A. Burton, Th.D., the Bishop Anderson Professor and chairman of religion, health and human values.

"For example, in certain cultures, it is customary for many family members to accompany a sick relative to the hospital. We often find this among African-Americans, Italian-Americans and the gypsies. Instead of saying, 'These people are disrupting our floor,' here at Rush we understand that in illness or grief, people need the resources of their community. So we try our best to make them comfortable."

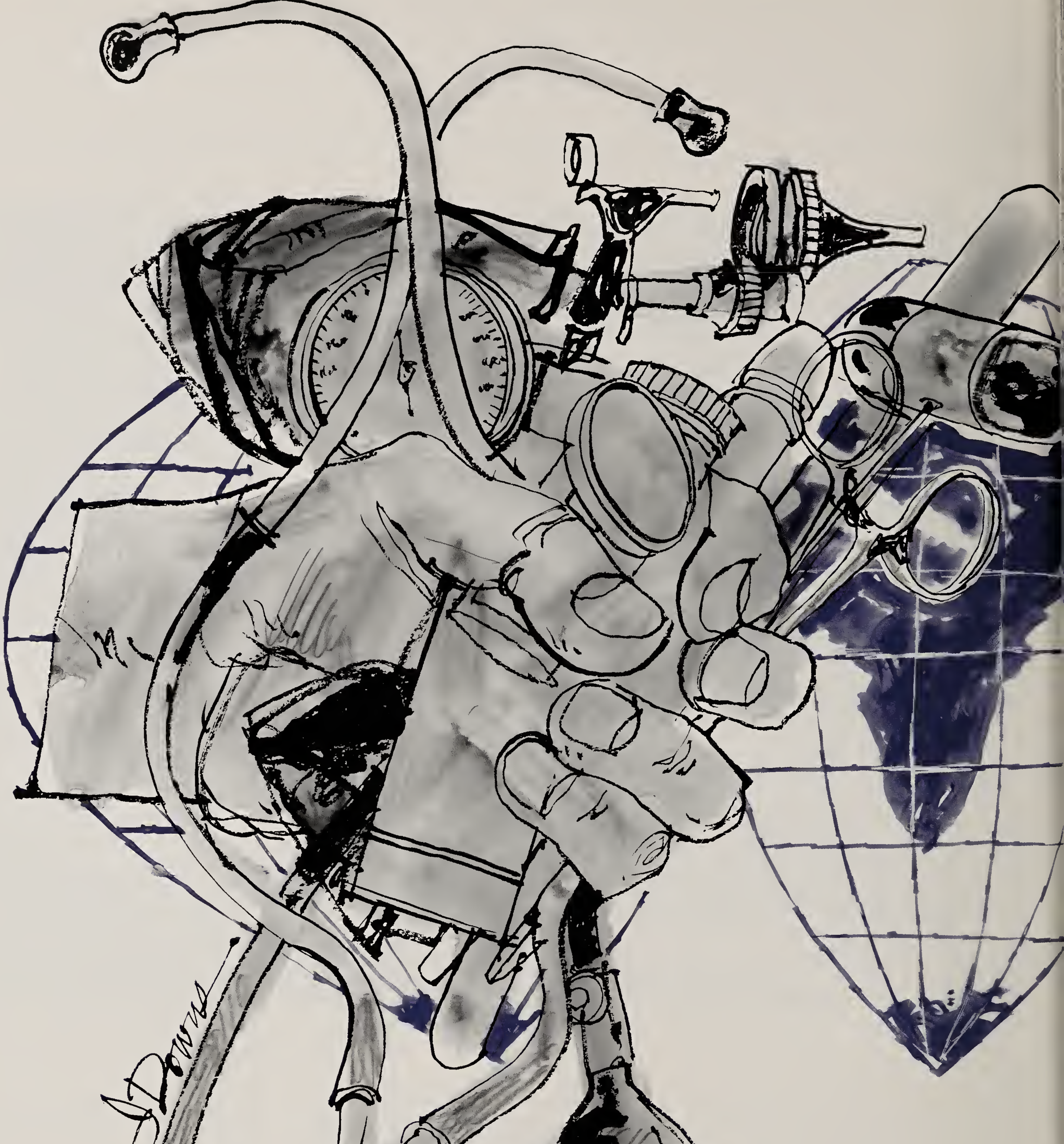
Lorie Rosenblum, Ph.D., L.C.S.W., agrees. "Often, when we have a conference for a black or Hispanic patient, the family will come in large numbers," says Dr. Rosenblum, a geriatric social worker at the Johnston R. Bowman Health Center for the Elderly. "They are not always the people who will be giving the direct care. But they come to represent family values and show their support of the patient simply by being there.

"If we're not culturally aware, we may see this as an obstruction, and think, 'Why are these people coming if they're not going to be involved?' In the Medical Center, we're used to problem solving," she continues. "But we also have to learn to accommodate different styles of interaction and realize that patients and families may have different needs and expectations in the health care setting."

Dr. Rosenblum teaches a class at the DePaul School for New Learning that addresses how a person's background can affect attitudes toward health. "One idea I try to stress to my students is that some cultures take a more wholistic approach to wellness.

"Asian-Americans, for example, have a well-developed tradition in medical treatment. They have a deep respect for the body as something that is not their own possession, but is handed down from their ancestors."

Says Dr. Burton, "When we talk about multicultural approaches to issues in health care we are talking about culture in its broadest and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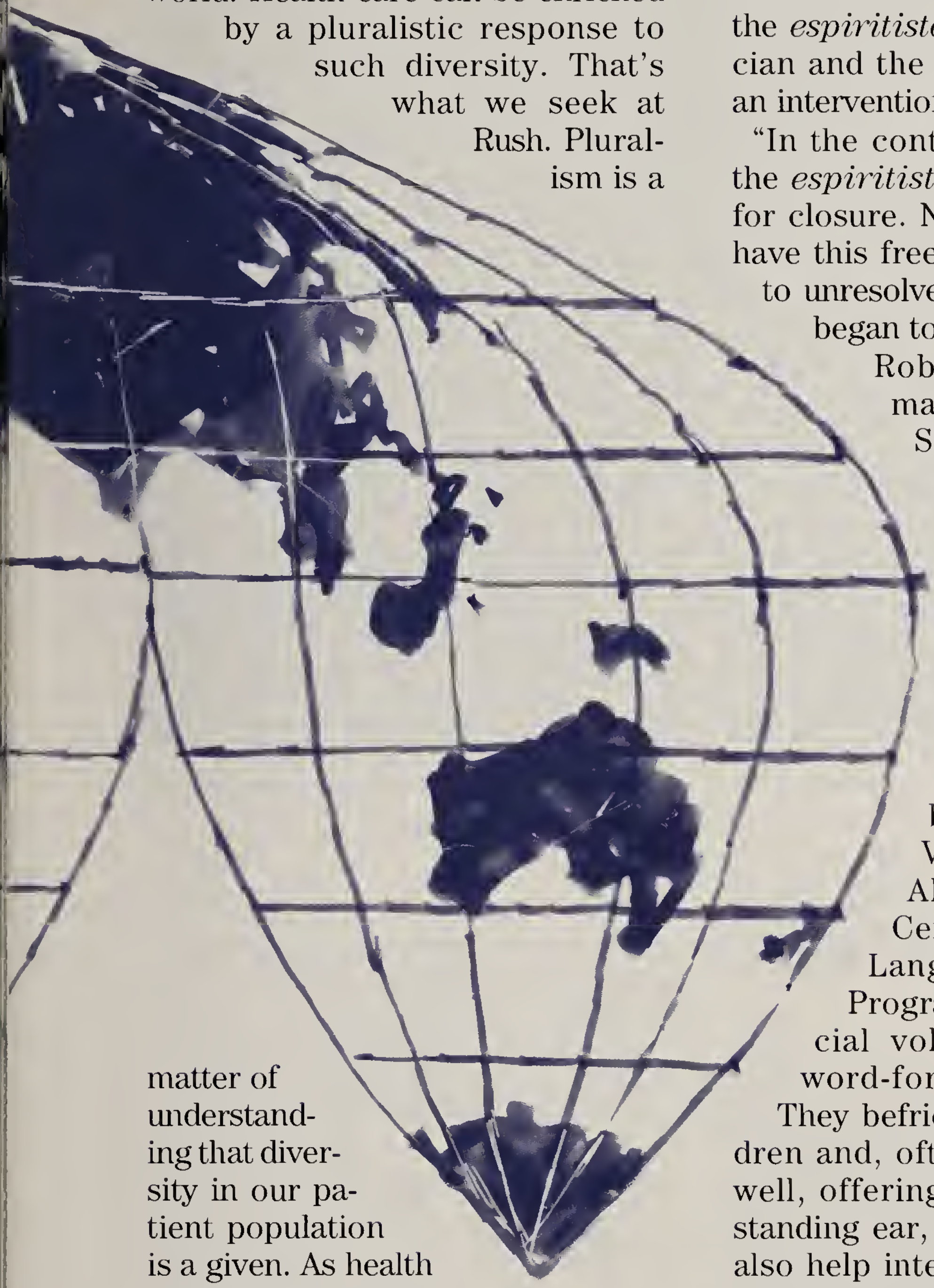
most profound sense — about the differences that make the world so interesting and so problematic.

"In Chicago, we have one of the largest ethnic mixes of any city in the world. Health care can be enriched by a pluralistic response to such diversity. That's what we seek at Rush. Pluralism is a matter of understanding that diversity in our patient population is a given. As health care providers, we must learn to join people where they are, using their language when we talk to them and listening to their stories."



He recalls a Puerto Rican family who came to the Medical Center for treatment. "The family thought their child was being haunted by a spirit, because she wasn't eating," he says. "The doctor believed her lack of appetite to be a case of unresolved grief, because the child's favorite grandfather had died. I suggested to the doctor that she check to see whether the family had an *espiritista* — someone in the Hispanic community who is an intermediary between the spirit world and the material world. So the *espiritista* met with the physician and the family, and then did an intervention.

"In the context of their culture, the *espiritista* ritualized the need for closure. Now the family didn't have this free-floating anxiety due to unresolved grief, and the child began to eat."

Robyn Fell, C.C.L.S., manager of Child Life Services, saw a need for intermediaries of a different kind for her young patients from other cultures.

Early last year, Child Life Services, in conjunction with Volunteer Services, began a Multi-Cultural Volunteer Program. Although a Medical Center-wide Foreign Language Interpreters Program exists, these special volunteers go beyond word-for-word translating. They befriend hospitalized children and, often, their families as well, offering support, an understanding ear, and friendship. They also help interpret unfamiliar cultures to health care workers.

"We need to understand other cultures so we know the appropriate ways to interact with the children, play with them, and help them interpret the hospital experience within the belief system of their culture," says Fell. "There are so many differences. Some cultures believe that illness is a punishment. In the Hispanic culture, touch is important and conveys caring, whereas in some of the Asian cultures, touching without permission is disrespectful. It's important to know these things.

"In Thai culture, it's wrong to pat anyone on the head, because they believe that's where the soul resides. And in Asian cultures, children are warned that getting dirty isn't proper, so we know not to have those children play with sand or clay or fingerpaints."

Volunteers who represent different cultures have given workshops for the staff. They have covered key words and phrases, and topics such as how their culture views childrearing and health care, customs, and holidays. One volunteer translated the text for a coloring book into Spanish, so *Little Jerome and the Big Hospital* became *Niño Jerome y el Hospital Grande.*

Rachel Niño, a data researcher in medical oncology at Rush, volunteers her time to the program. Last year, she befriended Romero, a five-year-old boy from El Salvador. She also became a friend to Romero's mother, whose village back home was attacked while she was staying with her hospitalized son. The mother was unable to contact any of her family or relatives. Niño talked with her, giving her support and encouragement.

"Everything here was foreign to her, but she felt comfortable because everyone made her feel welcome and helped her out. She was impressed with the volunteers and said that the older ones looked like grandmothers," says Niño, who is a grandmother herself. "Romero responded very well to me. When it was time for him to leave, he didn't want to go, because he liked being here so much.

"The program is a great idea. It makes a big difference for the kids, because they're scared, and the parents feel comforted that someone is here for their kids besides themselves."

A displaced Kurdish family. *© Physicians for Human Rights.*

Answering a Call for Help

by Carmeline Esposito

On the evening of April 4, pediatrician Richard Sandler, M.D., received a phone call that put his commitment to human rights to the test.

Dr. Sandler, director of the Section of Pediatric Gastroenterology and Nutrition, is a member of Physicians for Human Rights and an expert on the medical care of refugees.

The phone call was from Robert Kirschner, M.D., deputy medical examiner of Cook County and a member of the organization's board of directors. Dr. Kirschner told him that little was known about the health conditions of the one million Kurdish refugees assembled in makeshift camps on the Turkish-Iraqi border in the wake of the Persian Gulf war. He wanted to put a team together to assess the problems and mobilize a rescue effort.

"I listened to Dr. Kirschner and began considering some important questions. Would I be able to contribute in a useful way? What resources would the team have? Who was there already, and what were they doing? The last thing I wanted was to go and be in the way."

The refugees, mostly from urban areas in northern Iraq, had fled the country for fear of repression by the advancing army of Saddam Hussein.

"Information was not available on the refugees' medical or living conditions," says Dr. Sandler. "I knew that we couldn't plan an assessment from far away. We had to go there."

Dr. Sandler had a conference call

with three other physician volunteers — Paul R. Epstein, M.D., M.P.H., of Harvard Medical School; Robert Cook-Deegan, M.D., of the National Academy of Sciences; and Asfandiar Shukri, M.D., of Northwest Medical Center in Detroit.

"After discussing the situation and our strategy, I left for Turkey on April 6."

Upon arriving in Ankara, Turkey, the team met with representatives of the International Red Cross, the World Health Organization, the U.S. State Department, the United Nations High Commissioner for Refugees and others to learn who was doing what for the refugees and to define their respective roles.

"We were 1,000 miles from the refugee 'camps,' strung out haphazardly along the southeastern border between Iraq and Turkey. Unfortunately, there was an airline strike in Turkey and getting to the camps was a major problem. Even the Turkish minister of health was having trouble getting out," recalls Dr. Sandler.

Complicating the trip further was the wet and cold spring weather in Turkey. "We rented a van, a 4-cylinder Ford, leaking oil, with one cylinder gone, and drove through harsh and snowy mountains for 28 hours straight."

At the border, the team found about 500,000 Kurdish refugees who had descended there literally overnight.

"Here were urban people — professionals, doctors, lawyers, shopkeepers, bus drivers — living on a mountainside. These people had walked or driven to the border with few belongings and had no idea of how they were going to live.

"I felt a kinship with a refugee doctor I met. He was about my age and he had kids the same age as my two children," says Dr. Sandler.

"We visited three camps — at Cigli, Cukurca and Uzumlu. There was no order. There were few latrines. Everyone was cold and hungry. Shelter from the rain and cold consisted of plastic sheets wrapped around those who had them.

"Our task was to do a rapid medical assessment that could help mobilize appropriate medical and humanitarian aid that we hoped would avert widespread disease and death," Dr. Sandler explains. "We visited three of the 12 camps at the border," he says, "and we got our best information at Cukurca."

At Cukurca, there were 60,000 refugees. Dr. Sandler and the team queried 226 of them with Kurdish physicians serving as interpreters.

For assessment purposes the team considered any grouping of 2 to 40 persons as a "household," whether they were related or not. "We attempted to obtain a representative sample from every 15th household in each of the major areas of the camp," adds Dr. Sandler.

> ***"These people … had no idea of how they were going to live."***

"We found that 75 percent of the people overall and 90 percent of the children had diarrhea. One out of five had bloody diarrhea. Drinking water was from rain runoff in the mud. About half of the Kurdish refugees we interviewed had respiratory symptoms.

"Everyone was living in mud, mud, mud and more mud mixed with human excrement.

"To assess mortality we went to a mass grave and talked to the gravediggers. In the Cukurca group of 60,000 there were were 30 to 60 refugees, mostly kids, dying each day, mostly from diarrhea. If you projected that number up to all the southeastern border refugee camps, several hundred children a day were dying."

Richard Sandler, M.D. (far right), on his mission to assess the medical needs of Kurdish refugees.

Emergency aid from the U.S. government consisted of airdrops of food and other provisions. "These airdrops tended to help the strong males who got to them first, rather than the general population," says Dr. Sandler.

The drops also posed a hazard. "The U.S. C5As flew low and dropped five or six crates at one time. These crates weighed several tons each and came at you from all directions. You had to gauge which way the wind was blowing and get out of the way."

In fact, there were news reports of refugees killed by the airdrops. Dr. Sandler himself narrowly escaped being hit by a crate while in the camps.

After three days of information gathering and assessment, the team returned to Ankara with findings and recommendations.

"We met with U.S. Embassy officials who were very glad to receive basic information about the situation and health of the Kurdish refugees. We wrote a four-page report, and within 48 hours the White House policy shifted away from airdrops to a more comprehensive public health emergency relief operation." Efforts were initiated to transfer control of the aid to international agencies.

The Cukurca camp was closed on June 1, with most of the refugees repatriated.

"For me, the Kurdish refugee experience underscored the need for quicker response to refugee crises. Thousands of lives are lost while governments, humanitarian organizations and other voluntary groups try to mount relief efforts, negotiate with governments and create a logistical infrastructure," says Dr. Sandler.

"On the border, we saw people willing and eager to help but without useful information. We accomplished our task by providing our government with the basic facts about the population and its urgent needs," he adds.

"For pennies a day, you can save children with immunizations, a clean water system and good nutrition. I believe that appropriate primary care is what's needed for refugee children, not high technology or expensive efforts."

When he returned to the States, Dr. Sandler served as spokesperson for the team, appearing at press conferences and on interview programs, including ABC-TV's "Good Morning America" and the "MacNeil Lehrer News Hour" on PBS.

Dr. Sandler and the team also published "Initial Medical Assessment of Kurdish Refugees in the Turkey-Iraq Border Region" in the August 8, 1991, issue of the *Journal of the American Medical Association.*

Dr. Sandler has taken an active role in human rights issues for more than 10 years. He spent a year (1980-1981) on the Cambodian border as a medical representative with the International Rescue Committee, and he is co-editor of *Medical Care Of Refugees* (1987, Oxford University Press).

The book took several years to compile, and is the only book of its kind in the world, according to Dr. Sandler. It provides a practical training guide to dealing with the three main causes of illness and death in refugee camps: diarrheal disease, infectious disease and malnutrition.

"But it is clear that the refugees' problems of hunger, disease from unsafe water and poor nutrition are not strictly medical problems," Dr. Sandler says.

"I view my role as one speaking clearly to the fact that the medical tragedies we see can only be addressed meaningfully by working our hardest to find political, economic and social solutions." ⓤ

Dr. Sandler with a patient at Rush.

RUSHROUNDS

NASA astronauts prepare for their shuttle mission's unusual sleep/wake schedule by wearing dark welder's goggles that block sunlight.

Bright Lights, Big Spaceship

You've just been assigned to work a 12-hour shift at a time when you would normally be asleep. How would you make the change and be productive? For some NASA space shuttle astronauts, that goal was met with ease.

Helping them accomplish this were Charmane Eastman, Ph.D., associate professor, and Karen Stewart, Ph.D., assistant professor, of the Department of Psychology and Social Services. Dr. Eastman is director of the Biological Rhythms Research Laboratory. At NASA's request, they designed pre-flight light and sleep schedules for astronauts on April's Discovery shuttle mission and the flight of Columbia in June. The schedules helped the astronauts adjust to sleeping and working at odd times.

Drs. Eastman and Stewart are studying ways to use bright light to shift circadian rhythms to accommodate changes in the work schedule. Human circadian rhythms — the inner cycles which control body temperature, mood, waking, sleeping, and all other body processes — are coordinated by the inherent timing mechanism known as the circadian or biological clock. In essence, the researchers "reset" the astronauts' biological clocks so they could sleep at a different time of the day.

Exposure to bright light at certain times makes the circadian clock shift. Drs. Eastman and Stewart scheduled the astronaut teams to spend several hours under a ceiling of fluorescent lights about 10 to 20 times more intense than ordinary room light. This became the crew's "sun" when they were indoors.

To create "night" during the day, astronauts wore dark welder's goggles with side guards to block light. "Exposure to sunlight during a 'night' section of the schedule would have counteracted the resetting of their clocks," says Dr. Eastman.

Astronauts followed the specially designed routine of bright light and darkness which pushed their clocks in the proper directions, enabling them to sleep and work productively.

The general aim of the Rush researchers' study of circadian rhythms and light is to develop practical recommendations for shift workers, who account for 20 percent of employees in the U.S.

Even permanent night workers have difficulty with sleep and performance. "Their work is called 'fixed' night work, but there's nothing fixed about it," says Dr. Eastman. "The work schedule's fixed but sleep time is not fixed, and that's the important part. It's really a tough problem."
— S.J.

Three Receive Trustee Medals

Three leaders in American health care — Leonidas H. Berry, M.D.; Eli Ginzberg, Ph.D.; and Mark H. Lepper, M.D. — were awarded Trustee Medals at Rush University Commencement June 8.

Dr. Berry is a 1930 graduate of Rush Medical College and is its 1987 Distinguished Alumnus. A pioneer in gastroenterology and endoscopy, he invented the first direct-vision suction instrument to remove diseased stomach tissue for microscopic examination.

Dr. Berry's award was presented by trustee Cyrus F. Freidheim, Jr., who said, "Dr. Berry's success by no means came easy and, in many respects, represented the triumph of personal character, ability and performance over long held and deeply ingrained social and professional attitudes."

Dr. Berry was the first black physician on the medical staff at both Cook County Hospital and Michael Reese Hospital and Medical Center.

Dr. Ginzberg, the graduation speaker, received his award from trustee Richard M. Morrow, who called the distinguished economist "a national treasure."

Dr. Ginzberg received his bachelor's, master's and doctoral degrees from Columbia University, where he is now the A. Barton Hepburn Professor emeritus in economics.

With a career spanning over half a century, he is renowned for his encyclopedic knowledge in the fields of health care economics and human resources. He is the author of more than 60 books, and has advised health care leaders in both the public and private sector, as well as U.S. presidents, cabinet secretaries, senators and congressional representatives.

Dr. Lepper is internationally known for his work in epidemiology and public health. He retired from the Medical Center in 1988.

"To those who have known him, and to those who have only heard of him, the name of Dr. Mark Lepper evokes something approaching a legend at Rush," said trustee Michael Simpson, who presented the award. Dr. Lepper has held many leadership positions at Rush, including executive vice president for professional and academic affairs, dean of Rush Medical College, and dean of The Graduate College.

Dr. Lepper is a former director of the Illinois Comprehensive Health Planning Agency. He is credited with designing and developing the Mile Square Health Center, one of the nation's first neighborhood health centers.

A total of 318 degrees were conferred at commencement. These included 114 doctor of medicine, nine doctor of nursing, 14 doctor of nursing science and nine doctor of philosophy degrees. The Master of Science degree was received by 83 graduates, 47 in nursing and 36 in allied health fields. The Bachelor of Science degree was conferred on 89 graduates, 80 in nursing and nine in medical technology. — *M.M.*

Mark H. Lepper, M.D., and his wife, Joyce.

Eli Ginzberg, Ph.D.

Leonidas H. Berry, M.D.

Pritzker Elected Trustee

Robert A. Pritzker has been named to the Medical Center's Board of Trustees. His election was announced by board chairman Richard M. Morrow at the June plenary meeting.

Pritzker is the president, chief executive officer and director of the Marmon Group, Inc. He holds executive positions in each of the group's more than 60 companies, which specialize in a broad range of manufacturing and service businesses worldwide.

He also is a director of Hyatt Corporation, Union Tank Car Company and S & W Berisford PLC. He lectures on business management at The University of Chicago Graduate School of Business.

Pritzker earned his Bachelor of Science degree in industrial engineering from the Illinois Institute of Technology (IIT), which later also awarded him an honorary doctor of humane letters and science degree.

Robert A. Pritzker

He has also attended California Institute of Technology, the University of Illinois, the University of Zurich and Case Institute of Technology.

Pritzker is chairman of the Board of Trustees of IIT, a trustee of the Chicago Symphony Orchestra and immediate past president of the Field Museum of Natural History. He is a member of the National Academy of Engineering. — *P.R.*

Research Center Gets New Home

The Center for Research on Health and Aging opened the doors of its new home in the Johnston R. Bowman Health Center for the Elderly in June. The Center is dedicated to the study of common chronic health problems of a growing population — the elderly.

Denis A. Evans, M.D., the Alla V. and Solomon Jesmer Professor of Gerontology and Geriatric Medicine, is director of the Center. He is well known for his clinical and community research on Alzheimer's disease.

"My original intention was to heighten awareness and research activity in geriatrics by recruiting experts in the field," says Thomas J. Schnitzer, M.D., Ph.D., the Willard L. Wood, M.D., Chair of Rheumatology. Dr. Schnitzer is a founder and former co-director of the Center. "I knew Dr. Evans could get the Center started in that direction."

Since his arrival last July, Dr. Evans has welcomed four additional researchers to the staff. Studies will target four areas: physical function and disability, Alzheimer's disease, infectious disease, and methods of health care delivery to older people.

"I chose these areas not

only because they're considered the most important in the lives of the elderly, but also because they draw on strengths available at Rush," Dr. Evans said.

Dr. Evans is the principal investigator on a five-year study of long-term cognitive and behavioral changes in people with Alzheimer's disease. The project is being funded by a grant of more than $1 million from the National Institute on Aging of the National Institutes of Health.

The aim of the study, which will be conducted in collaboration with the Rush Alzheimer's Disease Center, is to describe characteristic changes in patients' ability to think and understand as the disease progresses. It will also attempt to predict the percentage of patients who will need long-term institutional care or hospitalization.

Dr. Evans was also recently awarded a grant from the Scholl Foundation to test the feasibility of a community study of chronic health problems of the elderly.

In another study, investigators are looking for risk factors, such as behavioral problems or decline in physical function, that cause families to place their elderly relatives in nursing homes.

"We want to keep people living at home as long as possible because it gives them a better quality of life," said Dr. Evans.

Dr. Evans says he is pleased so far with the Center's accomplishments. "We continue in our efforts to secure funding for high-quality research. This will allow us to to proceed toward our foremost goal: better health for senior citizens." — *J.R.*

Improving quality of life for the elderly is the primary goal of the Center for Research on Health and Aging.

Seeking New Anti-Cancer Arsenal

The traditional anti-cancer arsenal — surgery, chemotherapy and radiation treatment — is powerful, and even more so when therapies are used in combination. But these "weapons" are sometimes ineffective against the subtle mechanisms of cancer growth and spread. What clinicians who treat cancer patients really need is a therapy that short-circuits or turns off the errant cell growth that is malignancy.

Increasingly, cancer researchers believe the solution lies in a better understanding of cancer's molecular biology — what exactly is happening at the cellular, even genetic, level.

This summer the Rush Cancer Center held a two-day meeting focusing on these issues. The First Annual Symposium on Molecular Biologic Advances in Cancer Research, Treatment and Diagnosis was attended by more than 170 clinicians and researchers who were addressed by 15 of North America's leading cancer biologists.

"The conference highlighted recent advances in cancer research and anticipated developments in diagnostic tools, prognostic markers and novel therapies for cancer," said Anand P. Iyer, Ph.D., assistant professor of internal medicine and a conference organizer.

> ***"What's happening in molecular biology today will define cancer treatment in the year 2000."***

Some investigations have already yielded tools for early intervention. Marc E. Lippman, M.D., discussed molecular markers that can predict the aggressiveness, or propensity to spread, of certain breast tumors. Dr. Lippman directs the Vincent T. Lombardi Cancer Center in Washington, D.C.

"Markers like these are increasingly important for clinicians in making decisions about cancer treatment," says Jules Harris, M.D., the Samuel G. Taylor III, M.D., Professor of Oncology and director of the Rush Cancer Center.

Michael Blaese, M.D., director of the National Cancer Institute (NCI), described clinical trials of molecular biologic therapies, including so-called gene therapy.

Gene therapy has allowed a young NCI patient afflicted with a rare and devastating immune system disorder to lead a more normal life.

Victims of this disease lack the gene that produces a key enzyme that rids the body of poisons. Using the new therapy, that gene is inserted into T-cells — white blood cells that fight disease — removed from the child's body.

When these cells are reintroduced into the body, they divide, reproducing the gene and, thus, the crucial enzyme. As a result, the child's immune response is strengthened.

Preliminary results have been encouraging — the child has produced up to 40 percent of the normal level of the enzyme. But it is too early to say she is cured.

Still, Dr. Blaese predicts that the next few years will see many more research proposals to use gene therapy to treat various immune system disorders, including AIDS. The therapy also has implications for controlling cancer spread.

"This field is the wave of the future. What's happening in molecular biology today will define cancer treatment in the year 2000," said Dr. Iyer. — *M.M.*

Mystery Disease Is Not All in the Head

One victim complained of being so tired she couldn't lift her head up from her pillow. Of limbs so stiff that walking up a flight of stairs was like climbing a mountain. Of headaches that wouldn't go away. The litany of symptoms continues: Swollen glands. Sore throat. Fever. Irritability. Disturbed sleep. Loss of concentration.

They're all signs of the baffling ailment called chronic fatigue syndrome (CFS). An early '80s outbreak of CFS in California kindled scientific interest in the disease. But it has been reported in the medical literature — under many different names — since the 1700s.

The symptoms of CFS may appear suddenly, and persist for years — in some cases for more than a decade. Until very recently, the disease was often mistaken for common illnesses that it resembles, such as mononucleosis. Worse, it was often shrugged off as hypochondria, as existing "all in the mind."

The federal Centers for Disease Control (CDC) now says that the disease is real, and is pursuing studies to better identify it and determine how it is caused. Ongoing investigations by Rush scientists are helping to validate the belief that chronic fatigue syndrome has an organic cause.

Working with colleagues at the University of California at San Francisco, Rush researchers have linked CFS to disproportionate levels of certain activated white blood cells, called CD8 lymphocytes. These are "soldiers" of the immune system, called to arms by the presence of foreign invaders.

The research compared 120 people with CFS to 50 without. "The overabundance of activated lymphocytes in the CFS patients may implicate an infectious agent," says Alan Landay, Ph.D., director of the Rush Retrovirology Laboratory and associate professor of immunology/microbiology, pathology and internal medicine.

Dr. Landay is now investigating how this agent might trigger the chronic activation of the immune system that characterizes CFS. He is also exploring why these particular cells are over-activated.

"This information may eventually lead to effective treatments for CFS," says Dr. Landay.

One research group, led by Elaine DeFreitas, Ph.D., of Philadelphia's Wistar Institute, has found evidence that CFS may be caused by a retrovirus.

"Our lab is now working to confirm and further explore the results reported by Dr. DeFreitas," says Dr. Landay. "We're building upon several years' research on HIV, the retrovirus that causes AIDS."

Before the discovery of HIV and HTLV-I, which causes leukemia, retroviruses were thought to exist only in animals. Now it is suspected that these wily viruses may cause many illnesses in the human immune system.

In the absence of a diagnostic test or a cure, physicians diagnose CFS by exclusion and treat the disease by relieving the symptoms.

"Once we rule out other causes of illness, we know we're probably dealing with CFS," says John Pottage, M.D., assistant professor, internal medicine, who has treated 200 people with CFS. "We recommend good nutrition, aerobic exercise and a daily multiple vitamin."

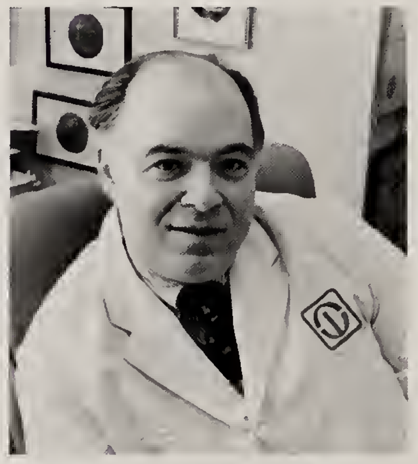
Some patients are also given low doses of an antidepressant to aid sleep. Aspirin and ibuprofen may be prescribed for muscle and joint pain.

"Most patients continue to work and do get better," notes Dr. Pottage. The usual course of the illness, he says, is two to four years. "By that time, for most people — but not all, unfortunately — symptoms have eased and patients feel 'back to normal.'" — *C.E.*

Klawans Is 49th Named Professor

Harold L. Klawans, M.D., professor of neurological sciences and pharmacology, has been named the first United Parkinson Foundation Professor in Neurological Sciences. This 49th endowed chair at Rush University is dedicated to the study of Parkinson's disease.

Dr. Klawans is the founder of the Section of Movement Disorders in the Department of Neurological Sciences at Rush, and is recognized as one of the world's foremost scientists in this area. He directs the Parkinson's Disease Clinic and was recently named director of the Neurology Residency Training Program.



Harold L. Klawans, M.D.

"For more than 20 years, the United Parkinson Foundation has supported research studies in Parkinson's disease under the direction of Dr. Klawans," said Judy Rosner, executive director of the United Parkinson Foundation.

"It has been a privilege to work with someone of his caliber. We know of many scientists doing research in Parkinson's disease and other movement disorders who were attracted to and trained in the field by Dr. Klawans," she said.

A former secretary general of the Research Group of Huntington's Chorea/World Federation of Neurology, Dr. Klawans is the author of more than 300 scientific papers. He has contributed to or written more than 300 textbooks, including the *Handbook of Clinical Neurology, Movement Disorders* and *Clinical Neuropharmacology*.

Dr. Klawans also has written three novels and several works of non-fiction. The most recent is *Trials of an Expert Witness: Tales of Clinical Neurology and the Law*, an account of litigation cases in which he provided expert opinions on behalf of patients. — *P.R.*

Alumni Awards Laud Excellence

Illustrious, eminent, pioneering ... These adjectives describe the 1991 distinguished alumni — Robert J. Hasterlik, M.D., and Joyce K. Keithley, D.N.Sc., F.A.A.N.

"Consistently on the cutting edge of medicine" is how colleagues describe Dr. Hasterlik, a 1938 graduate of Rush Medical College. Associates of Dr. Keithley, chairperson of OR/surgical nursing at Presbyterian-St. Luke's Hospital, admire her tenacity and strong work ethic.

The two alumni received their awards at separate commencement banquets honoring medicine and nursing graduates June 7 at Chicago's Hotel Inter-Continental.

Selected from nominations submitted by medicine and nursing alumni respectively, Drs. Hasterlik and Keithley reflect the highest ideals of their professions. Both are well-known researchers, authors, educators and clinicians.

Dr. Hasterlik is an authority on human radiobiology and the effects of radiation. He was instrumental in the creation of the State of Illinois Legislative Commission on Atomic Energy. He has also served as a consultant to the National Cancer Institute and Scripps Memorial Hospital Cancer Center.

A Life Trustee of Rush-Presbyterian-St. Luke's Medical Center since 1986, Dr. Hasterlik belongs to numerous professional societies. He is a fellow of the American Association for the Advancement of Science, the American College of Physicians, and the Radiation Research Society. He is also a member of the Research and Animal Health Committee of the Zoological Society of San Diego and the Radiological Society of North America.

On staff at the Medical Center since 1972, Dr. Keithley is recognized nationally for her clinical research on nutrition in surgical patients. She is currently exploring the complex relationship between nutrition, immune status and HIV infection.

In 1980, Dr. Keithley became the first person to receive a Doctor of Nursing Science degree from Rush University. She is the author of numerous publications on nutritional assessment and support, and critical care nursing. She is a member of Sigma Theta Tau, the American Nurse's Association, the American Society for Parenteral and Enteral Nutrition, and many other professional organizations. — *B.H.*

Robert J. Hasterlik, M.D.

Joyce K. Keithley, D.N.Sc.

'Pump Techs' Enter the '90s

Not too many years ago, innovators of open heart surgery constructed primitive heart-lung machines — often made of glass and stainless steel — to maintain their patients' blood circulation. They monitored these devices while simultaneously performing surgery.

Today, perfusionists, once known as "pump technicians," preserve the flow of life-giving blood during surgery.

Until recently, most perfusionists were medical technicians who learned through on-the-job training. But the evolution of new equipment, such as ventricular assist devices and balloon pumps, necessitated a more formal education. Specialists at the Medical Center recognized the need, and established a perfusion technology program at Rush University.

Rush is one of only six institutions in North America to offer a Bachelor of Science degree in perfusion technology. The program's first seven students will begin this September.

"We received a substantial number of applications for the seven slots," said Michael Djuric, C.C.P., chief of extracorporeal services and director of the perfusion technology program at Rush. "Many came from medical technologists, surgical intensive care nurses, respiratory therapists and others in professions on the fringes of surgery.

"We like to see that varied background, because each person's previous experience adds to his or her understanding of the operating room. This produces a better perfusionist and enhances the program."

The curriculum meets standards set by the American Medical Association's Committee on Allied Health Education and Accreditation, and will allow graduates to qualify for the American Board of Cardiovascular Perfusion's certification exam.

The four-year program begins with two years of basic science course work taken at another institution. Students come to Rush in the third year, and take courses in cardiopulmonary bypass, anatomy, physiology, pathology, pharmacology and biostatistics.

In the final year, each student learns perfusion skills during open heart procedures under the supervision of a certified perfusionist.

A unique aspect of the program is that students also learn how to manage a perfusion department.

"This is a mentally challenging field," says Djuric. "It calls on everything I know to make sure the patient is okay. I'm happy to be able to bring this education to the next generation." — *J.R.*

Philip B. Gorelick, M.D., associate professor, neurological sciences.

Making House Calls for Research

"We've encountered everything from pit bulls to people who make coffee and bake pastries when we visit them," says Philip B. Gorelick, M.D., associate professor of neurological sciences and director of the cerebrovascular disease section.

Adventures like these are unexpected results of a project that takes medical research out of the hospital and into patients' homes.

Dr. Gorelick and his research team are studying multi-infarct dementia, a cognitive impairment caused by a series of small strokes.

Their investigation, involving 150 participants, represents a novel approach to epidemiology — the study of all factors contributing to the occurrence of a disease within a population.

"One of the fascinating challenges in epidemiology is keeping your group of study patients together," says Dr. Gorelick. "I accomplish this by going to those who can't come to me."

Dr. Gorelick became interested in multi-infarct dementia in 1985, when he explored trends in his patients' lifestyles that may have caused strokes.

"While working with these patients, I became aware that because older people are living longer, there are more people with dementia. It seemed nobody really had a good idea of how strokes contributed to the problem. I thought it was important to get out there and find out."

Because the rate of occurrence of strokes is highest among the black population, Dr. Gorelick decided to target that group. He was recently awarded a $2.3 million grant from the National Institute on Aging for a study comparing stroke patients who develop dementia to those who don't.

"We've looked at the size of the stroke lesion — in other words, does the severity of a stroke affect a person's susceptibility to developing cognitive impairment? We're also looking at blood pressure levels, alcohol intake, the effects of smoking, and early-life factors," Dr. Gorelick says. An early-life factor, he explains, could refer to a head injury that happened in childhood, malnutrition, even a person's educational level.

By identifying what risk factors contribute to dementia in stroke patients, Dr. Gorelick hopes eventually to be able to prevent dementia in stroke patients.

As clues begin to emerge, so do some unforeseen benefits of the home visits.

"We really have a better appreciation of our patients," he says. "We get to know them — see where they've come from, their home environment. Most of them are homebound and have trouble getting to the hospital. Instead of adding to the burden by asking them to come and see us, we're lessening it." — *J.R.*

> ***"We've encountered everything from pit bulls to people who make coffee and bake pastries."***

Nurses Get Tips on State Exam

Preparing to become a registered nurse isn't easy. After earning the nursing degree and landing a job, a nurse still has one more obstacle to overcome before being able to practice: the National Council Licensure Examination for Nurses (NCLEX-RN).

Approximately 3,000 Illinois nurses take the two-day, multiple-choice state licensing examination, which is held twice a year. As many as 30 percent may fail. A new review course offered by ArcVentures, Inc., is aiming to reduce that number. ArcVentures is a for-profit subsidiary of the Medical Center which develops and markets health care products and services.

The ArcVentures program differs from other resources available to nurses preparing for the exam in one important respect. Instead of emphasizing subject matter, it concentrates on test-taking strategies and helping participants look for key words and phrases in a question.

The week-long course for nurses is modeled after similar, demonstrably successful courses that ArcVentures offers to medical students. Since 1988, more than 3,000 students have taken ArcVentures courses — at offices in Chicago, Miami, New Jersey and Los Angeles — designed to prepare them for the National Medical Board Examination and the Foreign Medical Graduate Examination of the Medical Sciences. Course participants' self-reported pass rates for these tests are consistently higher than the national average.

Eighteen nurses recently

participated in the new course, taught by Rush University College of Nursing faculty members, Rush nursing staff, and a psychologist.

"Three mock examinations allowed us to assess and focus on the students' needs," said Tamra Heberlein, M.S., director of new product development and marketing for the Educational Services Division of ArcVentures.

"We hope that by the end of the course they were more confident in their test-taking skills," she said.

The results of the test will be known this fall. Heberlein reports that the next few months will be spent fine-tuning the review course prior to expansion to additional sites in New Jersey and Los Angeles by January 1992. — *B.H.*

Taking Care of Our Environment

Taking out the trash at the Medical Center is not as simple as walking a few bags to the end of the driveway. It's not ordinary trash either.

Rush produces 1.6 million pounds of medical waste every year, which used to be incinerated and then taken to landfills. Now it's recycled, as Rush joins the handful of hospitals nationwide that have taken this important step.

Less than one percent of hospitals recycle medical waste. "The stimulus for recycling at Rush is the fact that landfills are closing up," says Steven Beaudoin, director, occupational safety. "Their longevity is seriously in question."

Inpatients produce from three to six pounds of waste per bed per day. This includes hospital gowns, gloves, towels and plastic cups or pitchers that have been contaminated by biohazardous materials, such as blood, body fluids, cultures and vaccines.

> ***"Recycling was the right thing to do from a hospital standpoint ..."***

The push toward recycling at Rush began in 1988 when one nursing unit started a general recycling and conservation program. Soon other Medical Center departments started similar programs of their own.

Employee interest spurred the administration to initiate a campus-wide plan through the Total Quality Management program. The clincher came with the signing of a contract in August 1990 with Stericycle, Inc., a medical materials processing and recycling firm.

Stericycle's treatment process is unique. First, waste is decontaminated using a method similar to microwaving. The firm sells the cleansed, processed material to vendors who manufacture new products from it or use it as an alternative fuel source.

In January of this year, Rush kicked off a general waste recycling effort. Now, most employees on campus recycle three of the most common and abundant wastes: paper, cardboard and metals.

If common waste comes in contact with medical waste, it also becomes contaminated, and adds to the total medical waste needing to be recycled — an increased expense.

By recycling paper, cardboard and aluminum cans apart from the medical waste, Rush saves money. Also, by Stericycle estimates, the Medical Center will save over 9,000 trees and over 1,600 barrels of oil in a year's time.

"Recycling was the right thing to do from a hospital standpoint since we're in the business of serving the health care needs of the community," says Beaudoin. "What better way to serve those needs than by taking care of the environment?"
— *S.J.*

Medical Staff Officers Elected

C. Anderson Hedberg, M.D., associate professor of internal medicine and senior attending physician, is the newly elected president of the medical staff at Rush.

He succeeds Walter W. Whisler, Jr., M.D., Ph.D., chairman of the Department of Neurological Surgery and senior attending physician.

As president, Dr. Hedberg will serve as a member of the Board of Trustees on its Executive Committee.

Dr. Hedberg received his medical degree from Cornell University Medical College, and pursued his internship and residency at the New York Hospital-Cornell Medical Center. Before joining the staff at Rush in 1985, he was assistant professor in medicine at Northwestern University Medical School and chairman of the department of medicine at Augustana Hospital.

Dr. Hedberg is a past president of both the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine. He is board certified in internal medicine and gastroenterology.

Ronald L. DeWald, M.D., senior attending surgeon and professor, Department of Orthopedic Surgery, is president-elect. The new secretary is Stephanie A. Gregory, M.D., senior attending physician and professor, Department of Internal Medicine. Barbara Santucci, M.D., senior attending physician and associate professor, Department of Pediatrics, was elected treasurer. — *C.E.*

C. Anderson Hedberg, M.D.

Day School Lights 20 Candles

A group of spirited four-year-olds recently celebrated a 20th birthday. It was the anniversary of the opening of their school — the Laurance Armour Day School (LADS) at Rush. With CEO and president Leo Henikoff, M.D., as a special guest, the class sang "Happy Birthday" and, with a united effort, blew out 20 candles on a cake.

At a time when many corporations are just beginning to offer day care benefits to their employees, the Medical Center is celebrating two decades of providing such care.

"Rush is not only innovative in its medical care, it's been innovative in handling work-family issues for its employees," says Jane Grady, M.A.T., director of LADS since its inception in 1971.

"We were the first licensed employer-sponsored program in Illinois. People from all over the state visit us to see our infant/toddler care."

LADS provides day care for the children of Medical Center employees, students, and faculty.

Thanks to a public-private partnership between Rush and the City of Chicago's Department of Human Services, parents of pre-school children may take advantage of sliding scale fees. As a result, the school is able to serve hospital employees at all income levels.

Day care programs are open to children four months through five years of age. A program is available for children in kindergarten through sixth grade, for before and after school.

LADS also sponsors a day-long camp for school-age children during the summer. "Many camps only run from 9 a.m. to 2 p.m.," says Grady. "And a lot of parents say, 'Well, what do I do before and after that?' Our hours are really employee structured. We're open from 6:30 a.m. to 5:30 p.m."

Two weeks of celebration culminated on June 22, when 20 kindergarten students graduated. Parents and faculty beamed as the children received their diplomas. And maybe Jane Grady was smiling a little more proudly than the rest, thinking about LADS' 20-year history and the hundreds of children who had graduated before.
— *N.S.*

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